‘AU-Sweet Scarlet’ Watermelon

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‘AU-Sweet Scarlet’ is a multiple-disease-resistant watermelon [*Citrullus lanatus* (Thunb.) Matsum. & Nakai] cultivar adapted to growing conditions in the southeastern United States. It has resistance to race 2 anthracnose [*Colletotrichum orbiculare* (Berk and Mont) Arx], fusarium wilt [*Fusarium oxysporum* f. sp. *niveum* (E.F. Sm.) Snyder and Hans.], and gummy stem blight [*Didymella bryoniae* (Auersw.) Rhem].

Disease is a major factor limiting production of watermelon in the southeastern United States. Anthracnose, fusarium wilt, and gummy stem blight are three of the most serious diseases. Severe crop losses and reduced yields of melons have resulted from these diseases in certain fields in Alabama. Although the damage seems to be more widespread in the Gulf Coast area, there have been frequent reports of damage in central and northern Alabama.

Although satisfactory control of anthracnose and gummy stem blight may be accomplished with the proper application of organic fungicides during normal weather conditions, no control measure is effective during periods of high humidity and excessive rainfall. Furthermore, three leading cultivars, ‘Charleston Gray’, ‘Jubilee’, and ‘Crimson Sweet’, are not resistant to race 2 anthracnose and gummy stem blight (Norton, 1979; Norton et al., 1983, 1986; Suvanprakorn and Norton, 1980). The only practical control now available for fusarium wilt is cultivars that are inherently resistant to the pathogen.

Identification of resistance to race 2 anthracnose (Sowell et al., 1980) and gummy stem blight (Sowell, 1975; Sowell and Pointer, 1962) in two plant introductions (PI 189225 and PI 271778) led to the initiation of an Alabama Agricultural Experiment Station watermelon breeding program to develop multiple-disease-resistant breeding lines that produce high yields of excellent-quality fruit. Two of these lines, AU-1 and AU-3, were released as ‘AU-Jubilant’ and ‘AU-Producer’, respectively (Norton et al., 1983). The AW-1001CSY breeding line was released as ‘AU-Golden Producer’ (Norton et al., 1991). AW-82-50CS breeding line was recently released as ‘AU-Sweet Scarlet’ (Norton et al., 1991).

Origin and breeding history

‘AU-Sweet Scarlet’ was developed by the Dept. of Horticulture, Alabama Agricultural Experiment Station, Auburn Univ. The culti-

var has good resistance to race 2 anthracnose, fusarium wilt, and gummy stem blight. ‘AU-Sweet Scarlet’ originated from the crosses ‘Crimson Sweet’ x PI 189225, ‘All Sweet’ x PI 362515, and ‘Calhoun Sweet’ x ‘W.R. Peacock’ (Fig. 1). Resistance to gummy stem blight and race 2 anthracnose was incorporated into the breeding lines from plant introductions by a backcross program. Progeny were selected in a screening program with inoculation tests in an incubation chamber and greenhouse as previously described (Norton, 1979; Sowell, 1975; Sowell and Pointer, 1962; Sowell et al., 1980; Suvanprakorn and Norton, 1980). Reaction to fusarium wilt was recorded on plants grown in pots in a greenhouse (Hopkins et al., 1987). The resistance was also observed in field plots heavily infected with fusarium, as indicated by plant injury the previous season. Selections were made annually for disease-resistant seedlings and high yield of excellent-quality fruit. Resistance to gummy stem blight and race 2 anthracnose was obtained from PI 189225 and PI 362515. Resistance to fusarium wilt was obtained from ‘Crimson Sweet’, ‘Allsweet’, ‘Calhoun Gray’, ‘W.R. Peacock’, and the plant introductions. Multiple-disease resistance of ‘AU-Sweet Scarlet’ has been good in field plantings (Table 1).

‘AU-Sweet Scarlet’ has been grown as AW-82-50CS in trials at the E.V. Smith Research Center and at several substations of the Alabama Agricultural Experiment Station, Auburn Univ.; in the Southern Cooperative Watermelon Trials in other southern states;

Fig. 1. Pedigree of ‘AU-Sweet Scarlet’ watermelon.

Table 1. Disease index ratings for resistance to anthracnose, fusarium wilt, and gummy stem blight in greenhouse tests of watermelon cultivars.

Cultivar	Disease index ²		Fusarium wilt (% dead plants)
	Anthracnose, race 2	Gummy stem blight	
Florida Giant	5 b ³	5 b	75.6 d
Charleston Gray	5 b	5 b	48.5 c
Crimson Sweet	5 b	5 b	22.5 b
Jubilee	5 b	5 b	53.0 c
AU-Producer	2 a	2 a	1.5 a
AU-Golden Producer	2 a	2 a	3.0 a
AU-Sweet Scarlet	2 a	2 a	4.0 a
Calhoun Gray	5 b	5 b	2.5 a

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²Disease index: 0 = no injury, 1 = 1% to 20%, 2 = 21% to 40%, 3 = 41% to 60%, 4 = 61% to 80%, and 5 = 81% to 100% injured plants.

³Mean separation within columns by Duncan’s multiple range test, $P \leq 0.05$.

Table 2. Yield and fruit characteristics of watermelon cultivars at four Alabama locations, 1991 and 1992.^z

Cultivar	Yield/ (t·ha ⁻¹)	Fruit wt (kg)	SSC ^y (%)	Quality preference ^w	Width : length ratio	Rind thickness (cm)	Rind firmness ^x (N)	Days to maturity	Flesh color	Rind pattern
Crimson Sweet	25.2 a ^v	5.8 c	10.4	8.0	0.91	1.52	196 c	75	Red	Striped
Jubilee	18.6 c	7.5 a	9.6	7.9	0.54	1.78	187 c	90	Red	Striped
AU-Producer	25.2 a	7.0 ab	10.8	8.2	0.86	1.78	222 b	75	Red	Striped
AU-Golden Producer	22.6 b	6.4 b	10.8	8.2	0.87	1.52	222 b	75	Yellow	Striped
AU-Sweet Scarlet	21.4 b	6.6 b	11.4	9.0	0.90	1.27	231 a	75	Dark red	Striped

^zReplicated trials, with four replications each at Clanton, Cullman, Fairhope, and Headland.

^yTotal soluble solids concentration (SSC) determined with Bausch and Lomb refractometer, 0% to 25% scale.

^xPuncture test performed with Instron 1122 Instrument, 1-cm² Magnus Taylor probe. Puncture made at 5-cm intervals beginning at stem end.

^wTaste panel response index: 9–10 = excellent, 7–8 = good, 5–6 = acceptable, and <5 = unacceptable.

^vMean separation within columns by Duncan's multiple range test, $P \leq 0.05$.

and in demonstration plantings by commercial growers.

Description

'AU-Sweet Scarlet' is resistant to race 2 anthracnose and races 0 and 1 fusarium wilt (Table 1). Resistance to gummy stem blight and anthracnose is significantly higher in 'AU-Sweet Scarlet' than in 'Crimson Sweet' and 'Jubilee'. Multiple-disease resistance in 'AU-Sweet Scarlet' also has been excellent in field plantings at locations in Alabama and other southern states. 'AU-Sweet Scarlet' was found to be superior to 'Crimson Sweet' and 'Jubilee' in quality evaluations (Table 2).

Fruit yield was similar to that of 'AU-Golden Producer', but less than that of 'Crimson Sweet' or 'AU-Producer' (Table 2). Fruit weight compares favorably with other 'Crimson Sweet'-type cultivars. Rind firmness was higher for 'AU-Sweet Scarlet' than for any other cultivar tested. A darker red flesh color (46A) was observed for 'AU-Sweet Scarlet' than for 'AU-Producer' (46B) and 'Crimson Sweet' (46C), as determined by the *RHS Colour Chart* (Royal Horticultural Society, 1986).

Taste tests indicated that the edible quality (color, texture, and flavor) was higher in 'AU-Sweet Scarlet' than for any other cultivars evaluated (Table 2). Mean total soluble solids concentrations of 'AU-Sweet Scarlet' flesh was higher than for 'Jubilee' and similar to that of the other cultivars (Table 2).

The fruit of 'AU-Sweet Scarlet' are round to oblong-round in shape with few culls. Mel-

ons were similar to 'AU-Producer' and 'AU-Golden Producer' in weight. Weights are mostly in the 4- to 6.5-kg range, but weights of 7 kg are not uncommon. The rind color is light green with dark-green stripes; the flesh is bright red and firm but not tough. Rind and flesh characteristics make the melons well adapted to shipping.

Summary

'AU-Sweet Scarlet' is superior to current cultivars in disease resistance and satisfactory in quality and yield. 'AU-Sweet Scarlet' has multiple-disease resistance, with good resistance to anthracnose, gummy stem blight, and fusarium wilt. 'AU-Sweet Scarlet' is being released to broaden the base of high-quality, disease-resistant melons available to growers in the southern United States. This high-quality fruit with intense bright-red flesh color is suitable for commercial markets, roadside markets, and home gardens. Because of its early maturity, 'AU-Sweet Scarlet' fits well into the commercial production program to lengthen the season for any given production area or grower.

Availability of seed

An exclusive release of 'AU-Sweet Scarlet' was made to Hollar and Co., Rocky Ford, CO 81067, for seed production and marketing. A plant variety protection certificate no. 921001 was awarded to the cultivar AU-Sweet Scarlet.

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