'AU-Golden Producer' Watermelon

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Prevalence of diseases, particularly anthracnose [*Colletotrichum orbiculare* (Berk. & Mont.) Arx.], fusarium wilt [*Fusarium oxysporum* Schlecht. (emend. Snyder & Hans.) f. sp. *niveum* (E.F.Sm.)], and gummy stem blight [*Didymella bryoniae* Auersw. (Rhem.)], is a major factor limiting watermelon production in the southern United States. Although anthracnose and gummy stem blight may be controlled satisfactorily by applying proper organic fungicides during normal weather conditions, chemicals are not effective during periods of high humidity and rainfall. Furthermore, the three leading cultivars—Charleston Gray, Jubilee, and Crimson Sweet—me not resistant to either anthracnose race 2 or gummy stem blight (Norton, 1979; Norton et al., 1983a, 1986; Suvanprakorn and Norton, 1980).

The discovery that certain plant introductions (PI 189225 and PI 271778) were resistant to anthracnose race 2 (Sowell and Pointer, 1962) and gummy stem blight (Sowell et al., 1980) initiated an Alabama Agricultural Experiment Station watermelon breeding program to develop multiple-disease-resistant breeding lines with high yields of excellent-quality fruit.

AU-1 and AU-3 were released as 'AU-Jubilant' and 'AU-Producer', respectively (Norton et al., 1983b, 1986). The AW-83-1003CSY breeding line is being released as 'AU-Golden Producer'.

Origin

'AU-Golden Producer' was developed by the Alabama Agricultural Experiment Sta-

tion, Dept. of Horticulture, Auburn Univ. It originated from a mutant plant found in an isolated planting of 'AU-Producer' breeder's seed (Fig. 1) (Norton et al., 1991). 'AU-Golden Producer' has multiple-disease resistance to anthracnose races 1 and 2, fusarium wilt, and gummy stem blight. Resistance to gummy stem blight and anthracnose race 2, secured from PI 189225, was incorporated into breeding line AW-76-3 (AU-3) through a screening program that used an incubation chamber and greenhouse to eliminate susceptible plants from the population. Reactions to the anthracnose and gummy stem blight pathogens were evaluated by conducting inoculation tests in an incubation chamber and greenhouse (Norton, 1979; Sowell, 1975; Sowell and Pointer, 1962; Sowell et al., 1980). Reaction to fusarium wilt was recorded on plants grown in field plots heavily infected with fusarium, as indicated by plant injury the previous season. Resistance to fusarium wilt races 0 and 1 was secured from both parents.

Fig. 1. 'AU-Golden Producer' watermelon pedigree.

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'AU-Producer' originated at Auburn from a program of backcrossing and inbreeding to obtain resistance to anthracnose, downy mildew, fusarium wilt, and gummy stem blight. It is an inbred line from the cross of 'Crimson Sweet' × PI 189225 (Norton et al., 1983b). Following the cross, a backcrossing and disease screening program was used to select for disease-resistant seedlings and high yield of excellent-quality fruit.

'AU-Golden Producer' was discovered in an isolated planting of breeder's seed. The plants were selfed for three generations and seed were bulked from row-in-row selections. Seed from row-in-row selections were bulked for two more years from isolated plantings. An isolated planting of breeder's seed was made in 1990 for release as a named cultivar.

'AU-Golden Producer' has been grown as AW-83-1003CSY in trials at the E.V. Smith Research Center and at several other substations of the Alabama Agricultural Experiment Station, Auburn Univ.; in Southern Cooperative Watermelon Trials in other southern states; and in demonstration plantings by commercial growers.

Description

'AU-Golden Producer' was rated resistant to anthracnose, fusarium wilt, and gummy stem blight in greenhouse and field screening tests (Table 1). 'AU-Golden Producer' has exhibited excellent multiple-disease resistance in field plantings in Alabama and other southern states.

'AU-Golden Producer' fruit are heavier than those of 'Crimson Sweet' (Table 2). Melons are round to round-oval with few culls (Fig. 2). Sizes are mostly in the 9- to 14-kg range, but weights of 16 kg are not uncommon. The rind is smooth, hard, and tough, and is ≈ 1.9 cm thick. The rind is light green (138B) with dark-green (136A) stripes, and the flesh is a bright yellow-orange (23B) (Royal Horticultural Society, 1966). The flesh is firm (Table 2) but not tough. Overall, edible quality (color, texture, and flavor) was judged by us to be relatively high (Table 2).

Fruit yield was higher for 'AU-Golden Producer' than for 'Crimson Sweet', 'Jubilee', and 'Charleston Gray' and comparable to 'AU-Producer' (Table 2).

'AU-Golden Producer' is superior to the current cultivars of this type in yield, quality, and disease resistance, and it is similar to 'AU-Producer'. 'AU-Golden Producer' is multiple-disease resistant, with resistance to anthrac-

Table 1. Disease injury ratings for resistance to anthracnose, fusarium wilt, and gummy stem blight.

Watermelon cultivar	Disease injury		
	Anthracnose race 2 ²	Fusarium wilt (%)	Gummy stem blight ³
Charleston Gray	5 b ⁴	48.5 C	5 b
Crimson Sweet	5 b	22.5 b	5 b
AU-Producer	2 a	1.5a	2 a
AU-Golden Producer	2 a	3.0 a	2 a

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

³Percentage of plants affected.

⁴Mean separation within columns by Duncan's multiple range test, $P \leq 0.05$.

Table 2. Average yield and fruit characteristics of watermelon cultivars, means of four Alabama locations.

Variety	Yield (kg·ha ⁻¹ , 1000s)	Fruit wt (kg)	Soluble solids concn ² (%)	Quality preference	Width : length ratio	Rind thickness (cm)	Rind firmness ³ (N)	Days to maturity	Rind color
Charleston Gray	42.4	8.7	9.8 b	7.3	0.44	1.42	227	80	Gray, net
Crimson Sweet	35.8	8.2	10.4 a	8.0	0.62	2.18	464	75	Green, striped
Jubilee	42.2	9.7	9.6 b	7.9	0.43	2.54	4 4 3	90	Green, striped
AU-Producer	44.3	8.6	10.8 a	8.2	0.84	1.91	527	75	Green, striped
AU-Golden Producer	44.1	8.5	10.8 a	8.2	0.84	1.91	527	75	Green, striped

²Total soluble solids concentration determined with Bausch and Lomb refractometer, 0% to 25% scale.

³Response index: 9–10 = excellent, 7–8 = good, 5–6 = acceptable, and <5 = unacceptable.

⁴Puncture test performed with Instron 1122 Instrument, 1-cm² Magnus Taylor probe. Puncture made at 5-cm intervals beginning at stem end.

Fig. 2. 'AU-Golden Producer' watermelon.

nose race 2, fusarium wilt, and gummy stem blight. The cultivar is being released to broaden the base of high-quality melons available to growers in the southern United States. Because 'AU-Golden Producer' matures early (77 days), it fits well into the commercial production program to lengthen the shipping season for any given production area or grower.

Availability

An exclusive release of 'AU-Golden Producer' was made to Hollar and Co. (Rocky Ford, Colo.) for seed production and marketing. Growers and home gardeners can find seed of this release at wholesale and retail outlets.

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