# A Bacterial Disease Causing Severe Damage to Susceptible Plant Introductions of Muskmelon

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**ABSTRACT**

Sowell, G., Jr. 1981. A bacterial disease causing severe damage to susceptible plant introductions of muskmelon. Plant Disease 65:609-610.

An unidentified bacterium caused leaf spot on susceptible plant introductions of muskmelon (*Cucumis melo* L.) and also on *Curcurbita pepo* 'Early Yellow Summer Crookneck,' *Cucumis sativus* 'Explorer,' and *Citrullus lanatus* 'Charleston Gray.'

Scattered hills of muskmelon plant introductions were affected by an angular leaf spot in the 1977 plant introduction nursery at Experiment, GA. In 1978, the disease was widespread in the nursery as plants approached maturity, and it killed most of the foliage of some plant introductions. Other foliar diseases caused minor damage in 1978; thus damage caused by the bacterial disease could be assessed accurately. The purpose of this study was to determine the cause of the leaf spot, to describe the symptoms, and to determine the susceptibility of muskmelon cultivars.

## MATERIALS AND METHODS

Bacteria were isolated from the leaves of plant introductions growing in the field and in the greenhouse by streaking on King's medium B (1). Bacteria were also isolated from seedlings grown from seed of breeding lines. Single colonies were transferred to slants of King's medium B.

Bacteria from 1-day-old cultures from muskmelon were suspended in deionized water, diluted to a concentration of about $5 \times 10^5$ colony forming units per milliliter and sprayed on eight seedlings each of PMR 45 and PI 254695 muskmelons until runoff. Inoculated plants were placed in a moist chamber at $25 \pm 3$ C for 24 hr. Three days after inoculation, leaf spots were triturated in a drop of sterile $H_2O$ and the suspension was streaked on King's medium B.

A host range test was conducted in the greenhouse by inoculating PI 321005, PI 254695, and cultivar PMR 45 of muskmelon (*Cucumis melo*), *Cucurbita pepo* 'Early Yellow Summer Crookneck,' *Cucumis sativus* 'Explorer,' and *Citrullus lanatus* 'Charleston Gray' with about $5 \times 10^5$ colony forming units per milliliter. Eight plants of each entry were inoculated. All 18 entries in the 1979 Southern Cooperative Muskmelon Variety Trials were inoculated and incubated in the greenhouse. In another test, 16 commercial cultivars, four breeding lines, and four muskmelon plant introductions were inoculated and incubated.

Each plot in the two tests of muskmelon cultivars consisted of a single row of 25 seeds. The design was a randomized block with four replications. Approximately 80 plants of each cultivar were tested. A disease index on a 0–5 scale of increasing severity was used to evaluate infection (3).

The size and appearance of representative isolates from muskmelon were compared with strain CB-9 of *Pseudomonas pseudoalcaligenes* subsp. *citrulli* (2) from watermelon by streaking them

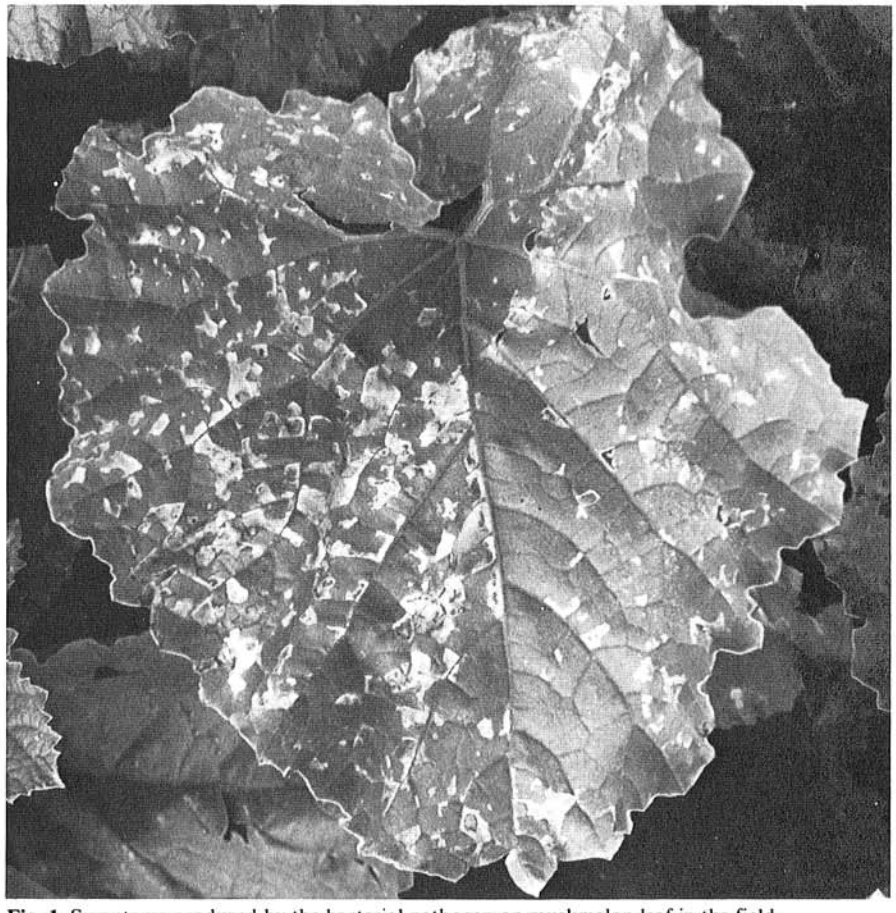

**Fig. 1.** Symptoms produced by the bacterial pathogen on muskmelon leaf in the field.

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**Table 1.** Reaction of 3-wk-old muskmelon seedlings in the greenhouse after inoculation with an unidentified bacterium isolated from muskmelon

| Seedling | Mean disease index[z] |
|---|---|
| PMR 45 | 1.0 a |
| Mainstream | 1.0 a |
| Smith's Perfect | 1.0 a |
| Gulfcoast | 1.0 a |
| PI 321005 | 1.0 a |
| Planters Jumbo | 1.0 a |
| Golden Perfection | 1.0 a |
| Harper Hybrid | 1.0 a |
| Early Dawn | 1.0 a |
| Saticoy Hybrid | 1.0 a |
| Ambrosia | 1.0 a |
| Dixie Jumbo | 1.0 a |
| Alaska | 1.0 a |
| Roadside | 1.0 a |
| FGT | 1.0 a |
| GQT | 1.0 a |
| G 25 T | 1.0 a |
| FG 2 P | 1.0 a |
| PI 123684 | 1.0 a |
| Hales Best Jumbo | 1.5 b |
| Earlisweet | 1.5 b |
| Honey Rock | 2.0 c |
| PI 124447 | 5.0 d |
| PI 254695 | 5.0 d |

[z] 1 = trace to 20% leaf area necrotic, 2 = 21–40% necrotic, 3 = 41–60% necrotic, 4 = 61–80% necrotic, 5 = 81–100% necrotic. Means not followed by the same letter differ significantly at $P = 0.05$ according to Duncan's multiple range test.

on King's medium B in petri dishes and incubating them at 27 C for 5 days.

## RESULTS AND DISCUSSION

A slow growing bacterium was isolated from angular to irregular leaf spots on muskmelon leaves collected in the nursery (Fig. 1). As new infections occurred and older lesions expanded, entire leaves were killed. PI 254695 grown in the greenhouse showed similar symptoms after inoculation with an isolate of the bacterium from infected leaves collected in the field.

Three days after inoculation with the bacterium, the cotyledons of PI 254695 showed irregular, tan, water-soaked areas ranging from 1 mm in diameter to one-half the area of the cotyledon. The true leaves showed angular to irregular, tan spots similar to those in the field. The leaf spots expanded in size until 2 wk after inoculation when they were up to 20 mm in diameter. PMR 45 developed yellowish spots usually less than 1 mm in diameter.

In the host range test, PMR 45 and PI 321005 muskmelons had necrotic flecks, usually 1 mm or less in diameter. PI 254695 muskmelon had tan leaf spots up to 20 mm in diameter. A few necrotic flecks and leaf spots up to 4 mm in diameter developed on squash. Cucumber had a few leaf spots that were light tan and up to 7 mm in diameter. Brown areas up to 20 mm in diameter developed on cotyledons and occasional spots appeared on the true leaves of watermelon.

None of the 18 entries in the 1979 Southern Cooperative Muskmelon Variety Trials showed symptoms. In the test of cultivars and plant introductions, only PI 254695 and PI 124447 were highly susceptible as evidenced by a disease index of 5.0 (Table 1). The disease index for Honey Rock was 2.0, which was significantly different from those of the remaining resistant entries except Hales Best Jumbo and Earlisweet.

The isolates from infected muskmelon plants in the field, inoculated plants in the greenhouse, and seedlings grown from seed supplied by Gary Reed and the strain of *P. pseudoalcaligenes* subsp. *citrulli* from watermelon produced colonies that were round, transparent, smooth, and slightly convex and averaged 4.1–4.4 mm in diameter at 5 days.

The pathogen isolated from muskmelon plant introductions produced colonies that were very similar to those of *P. pseudoalcaligenes* subsp. *citrulli* from watermelon (2). Host ranges of the two bacteria are similar (2). Because the muskmelon cultivars tested are resistant to the muskmelon bacterium, the disease is unlikely to cause much damage on the cultivars presently used by growers. Muskmelon breeders, however, should be aware that they might introduce susceptibility into new cultivars if they use plant introductions susceptible to the bacterial disease as sources of resistance to other diseases.


### ACKNOWLEDGMENTS

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### LITERATURE CITED


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