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Evaluating Muskmelon as an Alternative Greenhouse Hydroponic Crop 96-17

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Introduction

There were 55 acres of greenhouse vegetables grown in Florida in 1996. The primary crops include seedless cucumber, tomato, lettuce, hers, and pepper. The primary vegetable crop in greenhouses in the Suwannee Valley area has been tomatoes. The industry in the Suwannee Valley has decreased from approximately 18020 acres in 1991 to perhaps 10 acres in 1996. This decrease has been due, in part, to low tomato prices in the period of 1990 to 1995. As a result, growers have been interested in considering other crops. This trial was conducted to determine the feasibility of muskmelon as an alternative greenhouse crop.

Materials and Methods

A specialty muskmelon culture evaluation was conducted in a 22 x 60 ft greenhouse covered with two layers of polyethylene. The greenhouse was located at the Suwannee Valley Research and Education Center near Live Oak, FL. Seed of a green-fleshed muskmelon, cultivar 'Gallicum', was seeded directly into lay-flat bags of perlite on 21 March 1996. Four production bags were seeded with 3 plants per bag and four bags with 2 plants per bag to compare plant spacing. A dilute nutrient solution was used during the first week of growth, after which a complete nutrient solution with 135 ppm N and 230 ppm K was applied. The irrigation system was controlled by a starter tray system providing nutrient solution, as needed, each day.

On 24 April, the first female bloom opened and was receptive to pollen. A small artist paint brush was used to move pollen from male to female blooms. Receptive female blooms were checked daily and pollinated. Male blooms were borne on the main stem and the female blooms were borne on a short (6-12 inch) side branch. Each plant was trained up a string to an overhead cable, seven feet above the production bags.

Once the plant reached the top of the cable, it was trained along the cable for 8 to 12 inches and then let drop down toward the floor. As the growing point reached the floor, it was pinched out to terminate new growth. A total of 20 plants were grown in

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This Project was conducted in conjunction with the Columbia County School system, 5th grade enrichment class. Three 5th grade student mentors assisted weekly in the project by growing the crop and collecting the data. Students were: Derek Case, Lee Hochmuth, and Scott Hochmuth.

this trial. Insects were controlled with applications of an insecticidal soap as needed. Observations on diseases were also made during the season.

As fruit grew to the size of a baseball, they were supported in a sling made of either women's hosiery or soft polypropylene row cover material. Fruit were harvested at full slip, counted, weighed, and graded according to quality.

Results and Discussion

Overall marketable production was 1.8 fruit per plant and cull production was 0.5 fruit per plant. The US No. 1 fruit yield was 1.4 fruit per plant and US No. 2 was 0.4 fruit per plant. Average weight for US No. 1 fruit was 3.7 lbs per fruit and US No. 2 was 2.5 lbs per fruit.

Production per plant was similar for plant populations of three vs. two plants per bag. Populations of three plants per bag produced 2.17 fruits per plant versus 2.38 fruits per plant for two plants per bag. Average fruit weight was also similar between the two populations. Average fruit weight was 3.16 lbs for three plants per bag and 3.29 lbs for two plants per bag. Therefore, populations of three plants per bag will result in higher yields for the greenhouse space without significantly sacrificing fruit size.

Fruits were graded as a cull for two reasons: (1) a slick, poorly netted fruit; or (2) fruit rot from gummy stem blight (*Didymella bryoniae*). Poorly netted fruit had very poor taste and low soluble solids. Plants in this trial were highly susceptible to gummy stem blight. In addition to fruit lesions and infection, several stem lesions per plant were frequently found. Due to the lack of effective fungicides labeled for greenhouse muskmelon, gummy stem blight could be a serious threat to successful production. A second disease concern was powdery mildew (*Oidium* sp.). Powdery mildew seemed less important than gummy stem blight; however, both were a concern.

Primary insect pests included silverleaf whitefly (*Bemesia argentifolii*) and several species of aphids. A high population of the parasitic wasp (*Diaeretiella rapae*) naturally developed in the greenhouse and maintained the aphid population at the manageable level. Both insect and disease problems were very similar to those commonly found in greenhouse cucumber production, except gummy stem blight was much more severe on muskmelon. In addition to concerns of gummy stem blight, the overall quality of the fruit was somewhat poorer than typical field production. Greenhouse-grown fruit was not as well netted, and lower in soluble solids than field-produced fruit.

Future work may be useful in refining water and nutrient management to improve fruit quality. Research to develop a disease management program will also be important.