Performance of Specialty Muskmelon Cultivars in High Tunnels and Open Fields

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This study was conducted to compare the performance of three specialty muskmelon cultivars under two production systems. The cultivars were ‘Lorio’, ‘Atello’, and ‘Velsat’, whereas the production systems were open field and high-tunnel culture. The muskmelons were harvested eight times during the season and fruit were counted and weighed. On the same day, total soluble soil contents were measured from five marketable fruit per experimental unit. The results indicated that there were significant effects of each of the main factors, but not of the interaction between them on the collected variables. Marketable fruit numbers were the highest in plots planted with ‘Velsat’, whereas there was no difference in fruit number between plots inside and outside the high tunnels. Marketable fruit weight increased by 12% when grown inside high tunnels in comparison with fruit produced in open fields, and ‘Lorio’ and ‘Velsat’ had the heaviest fruit. In contrast, ‘Atello’ had the highest soluble solid content (14 °Brix), while fruit produced inside high tunnels were sweeter (14 °Brix) than those obtained in open-field plots (11.5 °Brix).

Materials and Methods

This study was conducted from March to May 2009 at the Gulf Coast Research and Education Center of the University of Florida. The soil was a fine sandy Spodosol with <1.5% organic matter and pH of 7.2. Planting beds were pre-formed with a standard bedder, 28 inches wide at the base, 24 inches wide on the top, and 8 inches high. In Sept. 2008, the soil was fumigated with 350 lb/acre of methyl bromide + chloropicrin (67/33 v/v). Beds were covered with black high-density polyethylene mulch after injection of the fumigant. No pre-plant fertilizer was used. Fertilization and pest control was done according the requirements of the crop (Olson et al., 2009). Fertigation was applied trough a single-drip tape line (0.23 gal/100 ft/min) buried 2 inches.

Six treatments were tested using three muskmelon cultivars and two production systems. The experimental design was a split-plot design with four replications with the production systems as the main plots, and cultivars as the subplots. The production systems were high tunnels and open field; and the cultivars were ‘Lorio’, ‘Atello’, and ‘Velsat’. Passively ventilated tunnel (16 ft high and 300 ft long) units were utilized for this study (Haygrove Tunnels, Herefordshire, UK). The polyethylene film cover of the tunnels reduces the photosynthetic active radiation (PAR) by 40%. Muskmelon transplants in the two-true leaf stage (approximately 15 d old) were intercropped with strawberry on 20 Mar. 2009 in single rows 1.5 ft apart in 16 plants per 24 ft-plots with 16-ft alleys.

Muskmelon marketable fruit weight and number was recorded from eight harvests from 10 May to 12 June. For total soluble solids content, five mature fruit were chosen and a 1 inch by 1 inch center piece of each fruit was squeezed and the obtained juice was placed on a digital hand-held pocket refractometer (model PAL-1, Atago, Bellevue, WA). Total soluble solids content was measured on 28 May.

Collected data were analyzed using general linear model...
procedure to determine main factor effects and the interactions among factors. Treatment means were separated using a Fisher’s protected LSD test at the 5% significance level.

**Results and Discussion**

Cultivars had significant effects on fruit weight and fruit number and production systems had significant effects on fruit weight. However, the interaction between both factors was not significant. ‘Velsat’ had the highest fruit number and produced more than 20,000 fruit/acre followed by ‘Lorio’ and ‘Atello’ that were similar with 12,000 fruit/acre (Fig. 1A). Muskmelon plants grown inside the high tunnel and in the open field production systems had the same fruit number averaging 15,800 fruit/acre (Fig. 1B). ‘Velsat’ and ‘Lorio’ had the highest fruit weight with 8.9 and 8.2 ton/acre, respectively, followed by ‘Atello’ with 6.6 ton/acre (Fig. 2A). Fruit weight in high tunnel plot was 12% higher than in open fields (Fig. 2B).

Cultivars and production systems had significant effects on total soluble solids content of muskmelons. However, the interaction between the factors was not significant. ‘Atello’ fruit had the highest total soluble solids content with 14 °Brix followed by ‘Lorio’ and ‘Velsat’ with 12.3 and 12.5 °Brix, respectively (Fig. 3A). Fruit produced inside high tunnels had the highest total soluble solids content (14 °Brix), which was 22% higher than fruit from the open field with (11.5 °Brix) (Fig. 3B).

The differences between the two production systems could be related to the protection that high tunnels provide to the crop, where plants inside high tunnels were protected against rain and cold temperatures. As expected, there were distinctive performance

![Fig. 1. Effect of muskmelon cultivars (A) and production systems (B) on muskmelon cultivars fruit number. Balm, FL, 2009. Values followed by the different letters represent significant differences among treatments based on Fisher’s protected LSD test at the 5% significance level.](image1)

![Fig. 2. Effect of muskmelon cultivars (A) and production systems (B) on muskmelon cultivars fruit weight. Balm, FL, 2009. Values followed by the different letters represent significant differences among treatments based on Fisher’s protected LSD test at the 5% significance level.](image2)

![Fig. 3. Effect of muskmelon cultivars (A) and production systems (B) on muskmelon cultivars total soluble solids content. Balm, FL, 2009. Values followed by the different letters represent significant differences among treatments based on Fisher’s protected LSD test at the 5% significance level.](image3)
differences among specialty muskmelon cultivars. Muskmelons grown inside the high tunnels increased size and the postharvest quality of the harvested fruit. Fruit grown inside high tunnels were protected from rain, while two rains occurred in the open fields during the study, avoiding fruit cracking. Intercropping specialty muskmelon cultivars at the end of the strawberry season inside the high tunnels might be an alternative to increase revenues with reduced investment.

**Literature Cited**


