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CARIBBEAN FOOD CROPS SOCIETY

50

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EVALUATION OF FOUR TOMATO VARIETIES FOR COMMERCIAL ORGANIC PRODUCTION IN THE U.S. VIRGIN ISLANDS

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Abstract: Organic farming provides an opportunity to positively impact the environment, human health, and future yields. Tomato (*Solanum lycopersicum* L.) is a high value vegetable grown for the fresh market in the United States Virgin Islands. Four cultivars: “Mountain Fresh”, “Red Defender”, “Security 28”, and “Defiant” were evaluated for yield potential in an on-farm trial with farmer’s participation at Sejah Farm, St. Croix. The experimental design was a complete randomized block with three replications. The trial was conducted from November, 2012 through March, 2013. Crops were grown using National Organic Program standards and approved practices. Seeds were planted in seedling trays containing organic (farmer produced) compost, reared in the greenhouse, then transplanted into the field 21 days after germination. Plots consisted of three rows spaced 1.2 m apart and in-row plant spacing at 0.6m for a total of 13,883 plants per hectare. Organic fertilizer (Nature’s Nectar 5-4-5) was applied on a weekly basis using standard commercial fertilization rates through drip tape fertigation. The field was monitored for diseases and insect pests periodically by staff and our extension entomologist. Weeds were controlled manually and mechanically. Data on average fruit and yield per plant and overall yield was collected from eight harvests during the growing season. No significant differences were observed between the four cultivars tested for marketable, unmarketable, or total yield (marketable plus unmarketable yield). “Mountain Fresh” produced numerically higher total fruit yield with 37.1t/ha. “Defiant” produced numerically higher marketable (US #1) fruit yield with 25.0t/ha and also had numerically lower unmarketable fruit with 10.5t/ha. Based on these observations, all four cultivars tested can be recommended for commercial organic production in the USVI.

INTRODUCTION

Organic farming increased rapidly in recent years but growth has been much slower in most of the U.S. Caribbean region. The slow adoption and growth of organic farming is mainly due to the fact that it requires more specified production and management practices than a conventional production system. It requires different types of markets due to high price premiums and consumers who are willing to pay that price. Studies suggest that other obstacles to more widespread adoption of organic farming systems include the high managerial costs and risks of shifting to a new way of farming, limited awareness of organic farming systems, lack of marketing and technical infrastructure, and inability to capture marketing economies (OTA 2012). A study by the Economic Research Service pointed out that fees charged by state and private certifiers may also be a barrier in adopting certified organic farming system for some producers, particularly small and limited resource farmers (USDA-ERS, 2005).

In the USVI, consumers in the region are looking for locally produced, organically grown food; they are also looking for local growers to take measures to reduce impacts on the environment, for example, by practicing no- or low-till soil management. Farmers are inherently interested in methods that can reduce the deleterious effects to soil quality, soil erosion, soil compaction, excess fuel consumption, and contribution to greenhouse gases that can be caused by extensive tilling.

Organic vegetable production is challenging due to disease and insect pests in the hot, humid summers. Tomatoes are a high-value commodity in the United States Virgin Islands (USVI) and throughout the Caribbean. High yields of high quality tomato fruits can bring in good profits for growers. Many cultivars are available which are purported to have improved characteristics such as increased disease and pest resistance, high quality fruit, moisture tolerance, heat tolerance, and higher yields. However, cultivar testing is limited in our region. The objective of current was to evaluate four tomato varieties in the organic management system in local conditions, for the following characteristics: total yield, marketable yield, plant height, individual fruit size, length, and diameter.

MATERIALS AND METHODS

Organic seeds of four tomato varieties “Mountain Fresh”, “Red Defender”, “Security 28”, and “Defiant” were procured from Harris Seeds Co., NY and planted in trays in November, 2012 at the University of the Virgin Islands on St. Croix, reared in the greenhouse, and transplanted into the field 21 days after germination at Sejah Farm, St. Croix. Crop was grown under organic management practices approved National Organic Program (NOP) and products listed by Organic Materials Review Institute (OMRI). Transplants were raised in the greenhouse and transplanted in the field 3 weeks after germination. Field was disk harrowed and roto-tilled prior to transplanting. Plots consisted of three rows spaced 4’ apart, with 12 plants per row spaced and 2’ between the plants within a row. Plants were tied and supported with T-posts (6’). Supplemental water and nutrients were provided through gravity-fed drip irrigation. Dipel (*Bacillus thuringiensis*) was used to control *Manduca quinquemaculata* and Spinosad was used to control *Tetranychus urticae*, when pest populations exceeded action thresholds. Data collected from plants #2-11 from center row on maturity, plant height, fruits weight, marketable fruits (US#1), and yield. Fields were scouted and monitored for insect pests and diseases by Extension entomologist periodically. Weeds were controlled manually or mechanically. N, P and K fertilizers obtained from Planet Natural Inc., Bozeman, MT and applied weekly basis. Data on plant height, fruit weight and marketable yield collected from eight harvests during the growing seasons. Harvesting occurred twice weekly. Data were analyzed using GLM procedures of SAS.

RESULTS AND DISCUSSION

No significant differences were observed between the four cultivars tested for marketable, unmarketable, and total yield. “Mountain Fresh” produced numerically higher total fruit yield with 37.1t/ha (Fig.1, 2). “Defiant” produced numerically higher marketable (US #1) fruit yield with 25.0t/ha and also had numerically lower unmarketable fruit with 10.5t/ha (Fig. 3, 4). “Mountain fresh” produced biggest fruit (5.03oz) of the four varieties evaluated. Varieties showed good tolerance to pest and diseases in the growing season.

Results of tomato variety trial have been ongoing research interest at the Agricultural Experiment Station (Collinwood et al, 1982; Nandwani 2013; Ramcharan 1981). Palada and co-worker (Palada et al., 1999) found suitable six tomato varieties “Bonita”, “Empire”, “Keepsake” “Merced”, “Mountain Pride” and “Sunmaster” for organic production in the USVI. Tomatoes are one of the most popular fresh market vegetables grown commercially in the USVI. With the rising consumer demand for organic products, organic tomatoes should be an excellent prospect for local fresh market sales. The results will assist growers in choosing varieties that will improve their yields and profits in organic tomato production without using chemical fertilizers and pesticides.

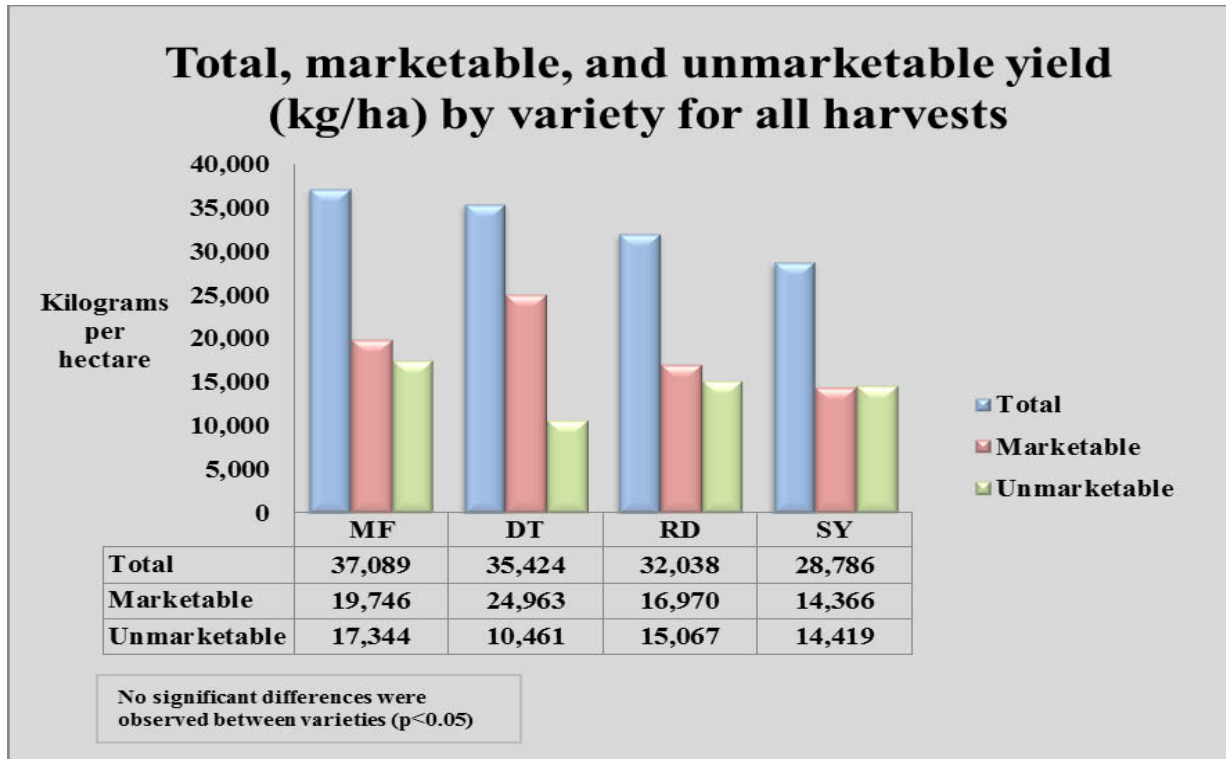


Figure 1. Yield characteristics for each cultivar selected.

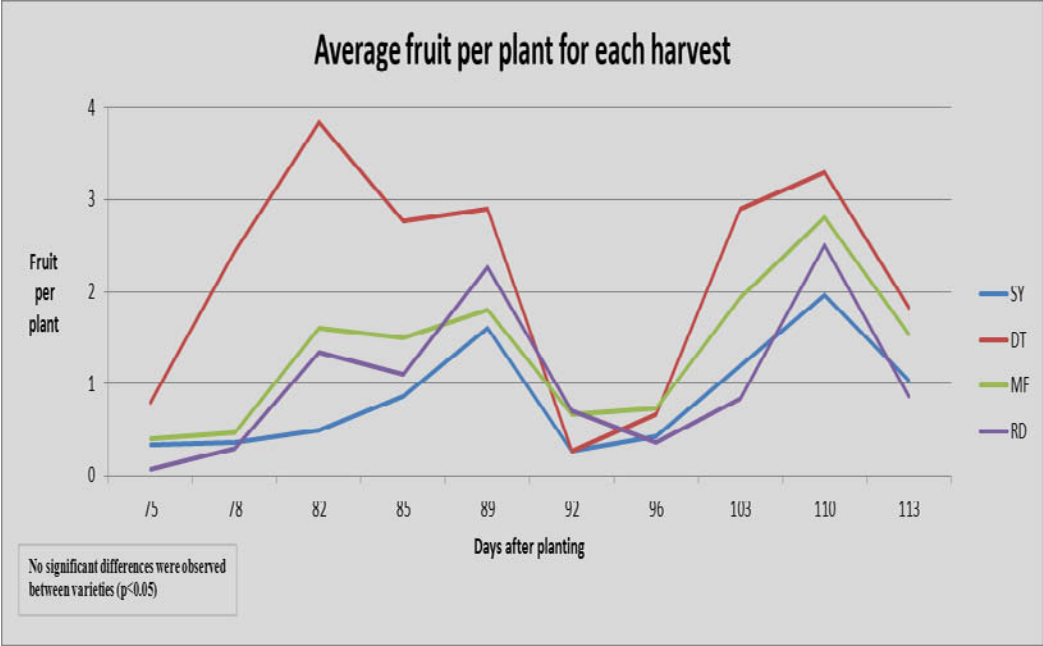


Figure 2. Fruit yield per plant for each cultivar.

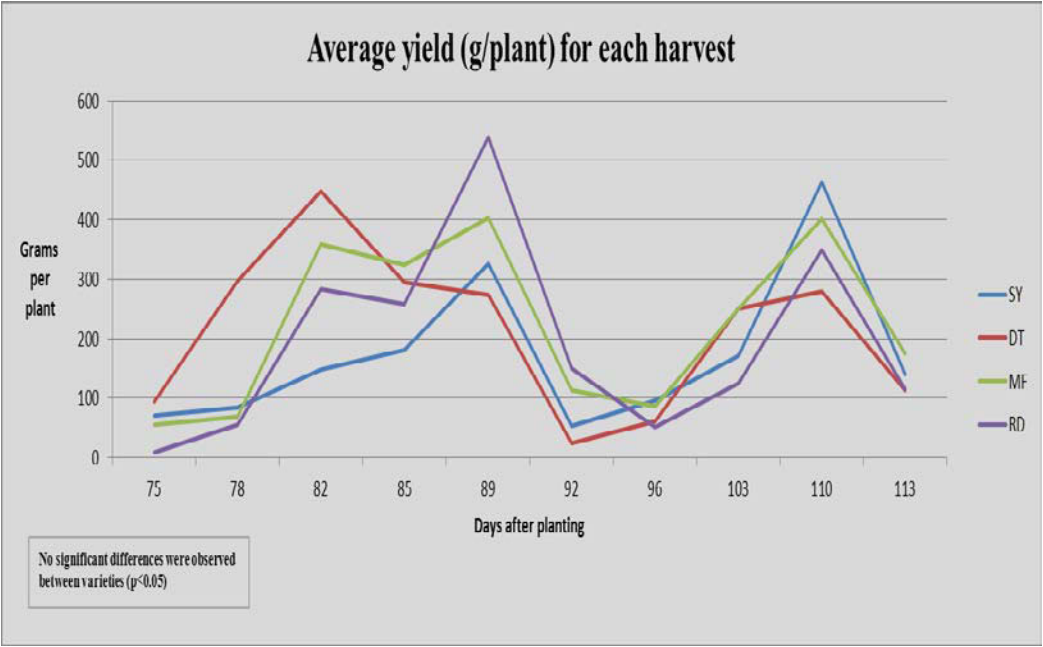


Figure 3. Total yield per plant by harvest for each cultivar.

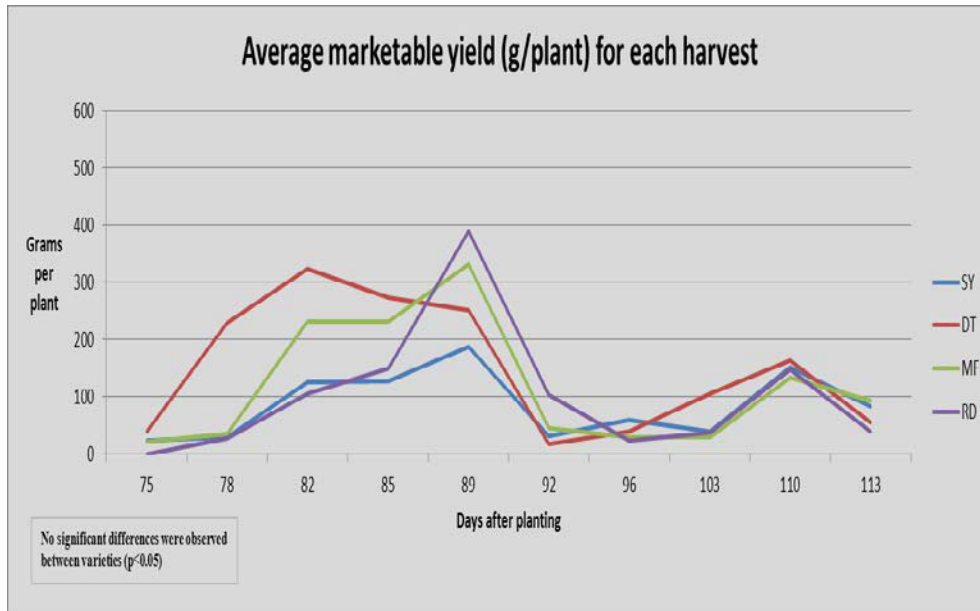


Figure 4. Marketable yield per plant by harvest for each cultivar.

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