



Centers at Piketon

"Exploring Economic Opportunities"



Use of Vermicompost for the production of Fresh Market staked tomato crops as potential organic and non-organic cropping systems.

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Objectives of research:

We evaluated the production and growth of Fresh Market Staked Tomatoes utilizing a soil amendment of cattle manure vermicompost, (i.e. worm castings), to determine if amendment of vermicompost had an effect on yield, growth, quality and fungal disease suppression of a tomato crop.

METHODS:

Planting: The Fresh Market Tomato, cv. Mountain Spring, was seeded on May 13, 1999, into 98 cell Pro Trays using Metromix 510 soilless mix. Seeded trays were put into a germination chamber, set at 80 degrees Fahrenheit, on May 13. Trays were removed on May 17 after germination. Transplants were grown from seedling to transplant stage for a 5-week period. Transplants were grown utilizing treatments of a 10 and 20% amendment of vermicompost to the soilless growing mix and soilless mix alone (Metromix 510) in the greenhouse. Plants were field planted on June 30, 1999 at Hillsboro, Ohio using a Water Wheel Planter.

Spacing: Rows were 5 feet apart, with plants set onto raised beds at 18" spacing between plants. The beds were covered with black plastic mulch with trickle irrigation under the mulch prior to planting. 11 plants per plot (5' x 15') provided a plant density of approximately 6,534 plants per acre.

Soil Type: Haubstadt Silt Loam

TREATMENTS

Four treatments were replicated 4 times in the field. Plot rows were 5 feet long, transplants were spaced 18 inches between plants. Treatments include: 1)Control- No soil or soilless mix amendment of Vermicompost 2)Amendment of cattle manure vermicompost with a transplant grown without vermicompost 3)Amendment of cattle manure vermicompost with a transplant grown with 10% amendment of cattle manure vermicompost 4) amendment of cattle manure vermicompost with transplant grown with a 20% amendment of cattle manure vermicompost.

Fertilizer and cattle manure vermicompost application: A pre bed was formed using a 3-point hitch raised bed shaper. Treatment 1) Applied 294 lbs. 34-0-0, 347.6 lbs. 0-46-0. per acre prior to planting. Treatment 2, 3 and 4) 6,000 lbs. of cattle manure vermicompost was applied per acre only. No additional fertilizer was applied. Applications amounted to 100 lbs. actual N per acre and 160 lbs. P₂O₅ per acre for all treatments. Applications were made according to soil test recommendations. A starter solution of 20-20-20 (1 lb. / 100 gal., 8 oz. Per plant) with transplant water was applied to all treatments.

Weed Control: 2.00 pt / A Treflan 4 E tank mixed with .51 lb./ A Sencor 75 DF pre plant incorporated on 6/29/99. Hand hoed and cultivated as necessary.

Pest Management.: None. There was little sign of fungal foliar disease pressure on this planting. Early Blight symptoms were minimal in this plot even though late season early blight pressure was heavy.

Irrigation (8 times) : Trickle Irrigated 6/30, 7/9, 7/20, 7/28, 8/12, 8/23, 9/2 and 9/13.

Harvests (1): One once over harvest was taken on October 8, 1999.

Observations:

Plant growth observations and ratings were observed and recorded. These observations and ratings included overall plant yield, yield at harvest, time of 1st harvest, average fruit size, fruit quality and plant foliar and fruit ratings for early blight and other fungal disease lesions. All treatments were compared to the traditional production techniques (control treatment) currently being used by staked tomato producers.

RESULTS:

Table1. Yields from Replicated Vermicompost Trial: Hillsboro, Ohio

Treatment	Marketable Red Ton/a	Marketable Green Ton/a
101	7.12	18.949
104	5.79	16.357
102	4.69	24.046
103	4.60	21.236
LSD	3.46	8.3358

Table 2. Yields and Comparisons from the replicated Vermicompost Trial: Hillsboro, Ohio

Treatment	Marketable Ton/a	Marketable Fruit/a	Average Fruit Wt.
102	28.74	144189	0.40
101	26.07	136348	0.41
103	25.83	124586	0.38
104	22.15	113260	0.39
LSD	9.05	40061	0.04

Total marketable, U.S. No. 1 and U.S. No. 2 , yields for the replicated treatments ranged from 28.74 tons per acre (Treatment 2) to 22.15 tons per acre (Treatment 4) . Treatment 2 had the highest amount of green marketable fruit at harvest and treatment 1 had the highest amount of red marketable fruit at harvest. There was very little difference in average fruit weight between the 4 treatments. There were no symptoms of early blight lesions on the fruit at harvest.

The long range goal of this trial is to educate organic and non organic commercial tomato crop growers how vermicompost may effect tomato crop production, yield, fruit quality and the incidence of fungal disease infection in their crops. The use of vermicompost as an soil amendment may be an alternative fertility option Ohio producers. A Field Night / Open House was held in June 1999 (Piketon location) and August of 1999 (Hillsboro location) where these trials were demonstrated to over 110 growers in attendance.

Greenhouse studies at OSU in Columbus have identified that vermicompost, (i.e. worm castings) does enhance transplant growth rate and crop time in greenhouse bedding plants and vegetable transplants. These amendments of vermicompost merit further studies and applications in commercial field studies as to the benefits of vermicompost to tomato crop production.

