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Evaluating Specialty Italian Eggplants within High Tunnels

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Introduction:

Eggplant (*Solanum melongena*) is a popular warm season vegetable in many regions of the United States. Eggplant has been difficult to grow in open field (i.e., gardens) in West Virginia due to damage from flea beetles and low night temperatures. There is an emerging market for specialty eggplants including white or miniature Italian types that have a unique flavor compared with traditional black, bell-shaped types. High tunnels could be used to successfully grow eggplants. High tunnels can increase the average daily temperature and serve as a buffer to flea beetle incursion. The objectives of this research project were to evaluate eggplants within high tunnels and examine organic insect management treatments for flea beetles.

Figure 1. Eggplants can have a diversity of color, shapes and flavor.

Materials and Methods:

Seven eggplant cultivars were seeded in 50-cell Pro trays filled with Promix BX Organic media on May 5, 2018. The cultivars were grown as organic transplants at the WVU Greenhouses in Morgantown for approximately 4 weeks before transplanting in a 30 ft. x 72 ft. high tunnel at the West Virginia University Horticulture/Organic Farm in Morgantown, WV. Prior to planting on June 6, 2018, a mixture of blood meal and compost was applied to the plant bed and thoroughly incorporated. Embossed black plastic mulch with 2 drip irrigation lines was then laid, and the plants transplanted. Each variety was replicated three times and planted in a staggered, twin row with each plant 16 inches apart. The eggplants were staked and trellised using a string weave method similar to tomatoes. The plants were irrigated approximately three times per week.

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Insect Management Evaluation:

To evaluate the effects of high tunnels, organic insecticides and row covers on flea beetles, the high tunnel sidewall vents were screened with *ProTek* net insect exclusion screens (25 gr). This mesh size can exclude flea beetles, but not all vents and doors into the high tunnel were screened, flea beetles were present in the high tunnel. One half of the replications were sprayed with *Azera* organic insecticide and the remaining replications were sprayed with *Azera* and covered with lightweight floating row cover (Agribon 19). There was an unsprayed, uncovered control for comparison.

Figure 2. Early-season flea beetle defoliation can significantly reduce yield of eggplants. (Photo credit C. Woodring)

Eggplants were harvest twice per week from August 7 through October 7. Each fruit was measured for length, diameter and weighed.

Results:

Table 1. Marketable yield of high tunnel eggplant cultivars evaluated in 2018.

Cultivar	Number/ plant	Avg. wt. (oz.)	Total Yield/plant (lbs.)	Diameter (in.)	Length (in.)
Aretussa	5.3	8.2	2.3	1.9	5.8
Beatrice	1.8	12.3	1.4	4.0	4.7
Clara	1.2	13.5	1.0	3.7	3.9
Hansel	6.1	3.1	1.2	1.3	6.8
Listada di Gandia	1.9	14.0	1.7	3.0	5.9
Paloma	2.1	12.9	1.7	3.5	4.5
Rosa Bianca	0.8	17.8	0.9	3.6	5.4
Significance	*0.8*	*1.0*	*0.8*	*0.1*	*0.1*

'Aretussa' is a elongated, white eggplant with excellent uniformity and yield. 'Aretussa' has a small size per eggplant. This cultivar out yielded all other cultivars evaluated and produced almost as many fruit per plant as 'Hansel'. 'Hansel' has tremendous yield of small, purple/black

eggplant fruit with a length of nearly seven inches (Table 1). 'Paloma' is a high yielding bell-shaped, white eggplant. 'Beatrice' performed better than 'Rosa Bianca' in terms of average fruit weight and number of marketable fruit per plant. So, if the desire is to have a violet colored eggplant, 'Beatrice' would be an excellent choice.

The insect exclusion screens placed on the sidewalls of the high tunnel did not exclude flea beetles from the high tunnel. Plants grown exclusively under row covers with a cover spray of *Azera* did fruit earlier than uncovered plants but there was no significant difference in total flea beetle damage with covered versus uncovered as long as the plants were sprayed weekly with the organic insecticide. Since eggplants are self-pollinated, keeping them covered will not reduce fruit set. The rowcover does provide an extra level of protection and can increase the average daily temperature, but should be used in combination with an organic insecticide for effective flea beetle control.

Discussion:

The highest yielding eggplant cultivars in this evaluation produced about 2 lbs. of eggplant/ft^2. An average retail price for eggplants is $2.00/lb. Therefore, gross revenue per square foot is approximately $4.00. Compared with tomatoes which can gross $10-15/$ft^2$, eggplants would not be a highly profitable crop to grow within a high tunnel. However, the demand for eggplants is growing and the ability to produce high quality eggplants within a high tunnel in regions which can't produce this crop in the open field does have an advantage.