Demonstration Site Examines High

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At the North Central ICM demonstration site in Elk County, two high tunnel greenhouses are being evaluated for use in early season production of tomatoes, melons, and peppers. On May 1 the tomato and pepper house was planted. This date is one month previous to the normal late frost date for the area. Started five weeks earlier, three varieties were planted with one variety per row. The spacing was three feet between rows and two feet between each plant. Peppers were planted the same day and were spaced one foot apart. One week later the melon house was planted with two feet between plants and six feet between rows. After the transplants were set out the high tunnel sides were rolled up every day around 7 a.m.-7:30 a.m. to prevent the buildup of excessive heat and humidity as well as reduce the potential for fungal infection.

In midsummer the houses were closed at approximately 5:30 p.m. and during the spring and fall around 4:30-5 p.m. On cool nights the house would retain an additional 10 degrees above the outside air with no additional heat being supplied. This gave an excellent boost to the plants making them grow and ripen much sooner than they would have on the outside. Daytime temperatures in the houses were only slightly greater than temperatures outside because the sides were rolled up allowing heat to circulate out of the house.

Immediately after planting a 6-foot stake was driven into the ground beside each transplant Several weeks later the plants were pruned to the stakes. All of the suckers except the one growing immediately below the first flower cluster were removed. This sucker and the main stem of the plant were then tied to the stake. Each week until the plants reached to the height of the top of the stakes, all suckers were removed from both main shoots and tied up. Upon reaching that highest point, the tops were removed. An alternative way to prune and stake plants would be to use the basketweave system. Irrigation water was applied at the rate of 1/2 hour every three days early in the season. Later as fruit size swelled and neared maturity the house was watered for an hour every three days.

Tomato Variety Comparison

The three tomato varieties compared were Big Beef, Ultra Sweet, and Bush Early Girl. The first variety, Bush Early Girl, is a large early tomato, a determinate type and grows only 56 days until harvest. Planted on May 1, the initial harvest was made July 17. This date is approximately one month earlier than typical first harvest in our area. As these tomatoes were being grown for a farmer's market, this would give a sizable advantage for the early market. For the first two weeks, the tomatoes sold for $1.60 per pound. Bush Early Girl has excellent quality and exceptional size for a tomato this early. Unlike Ultra Sweet and Big Beef, there was virtually no blossom end rot or catfacing. Bush Early Girl's yield totaled 227.5 pounds with an average of 15.16 pounds per plant. The Early Girl tomatoes were the most valuable because they came in before the price dropped significantly Sales from Early Girl totaled $242.95 with a seasonal average price of $1.06 per pound.

The second variety was Ultra Sweet. First picking was made on July 25 and it takes 62 days until harvest. An indeterminate variety, it showed a considerable amount of blossom end rot early and the size of the tomatoes was small compared to the other types. This variety is well liked in New Hampshire for its cold tolerance but other cultivars appear to be superior under Pennsylvania conditions. Ultra Sweet yielded 239 pounds of tomatoes with an average yield of 15.93 pounds per plant. They sold for an average of $1 per pound and the total sales from Ultra Sweet were $240.45.

The third variety tested was Big Beef. Big Beef is also an indeterminate variety and takes 72 days until harvest, but was first picked on July 26, only one day after Ultra Sweet. Big Beef is an extremely large, high quality tomato. The greatest problem found was excessive catfacing early in the season which degraded the quality. Big Beef was the highest yielding variety but the majority of the harvest came later in the season so that their price per pound was lower than the other two. The total yield was 312 pounds with an average of 20.8 pounds per plant. Sales from Big Beef totaled $283 with an average of 90 cents per pound.

Variety	Weight	Average Weight	Sales	Average Price
Early Girl	227 5	15.16 LB/plt	$242 95	$1 06/LB
Ultra Sweet	239	15 93 LB/plt	$240 45	$1.00/LB
Big Beef	312	20.8 LB/plt.	$283 00	$ .90/LB
Total	778 5	17.3 LB/plt.	$766.40	$ .98/LB

Variety	Days Until Harvest	Seeded	Transplanted	First Harvest
Early Girl	56	3/26	5/1	7/17
Ultra Sweet	62	3/26	5/1	7/25
Big Beef	72	3/26	5/1	7/26

These tomatoes were grown to sell at a farmer's market and the goal was to find which varieties would receive the best price throughout the year. Several possible conclusions can be made regarding which tomatoes would best answer this need. Growing only Bush Early Girl would result in a large number of tomatoes early in the season, which might exceed market demand, and later the number would diminish. Planting only Big Beef would bypass the early part of the season, which is partly what high tunnels are for! The first scenario would be to plant half of the house in Big Beef and the other half in Bush Early Girl. This arrangement would give a steady flow of tomatoes throughout the marketing season. Another option would be to plant two rows of Bush Early Girl and one row of Big Beef, so that a better price could be attained early on and have less tomatoes later when the price drops. A third option would be to plant part Early Girl and an additional type such as Goliath that is not noted for catfacing problems. A comparison planting of one row Bush Early Girl, one row Big Beef and one row Goliath should be conducted.

Several other varieties that performed well for Tim and Janet Taylor from Crossroad Farm in Vermont were Match and Trust. They also found Big Beef and Ultra Sweet to produce well for them. They liked Ultra Sweet for its flavor, shape, and size. This possibly could be due to their 90-day growing season and cold zone 4 climate where Ultra Sweet seems to produce better than other varieties.

Commercial Tomato Production

The following information is from a cost analysis sheet for high tunnel tomatoes prepared by Dr. Wells and Mike Sciabarrasi from the University of New Hampshire. All information is for a standard 14-foot by 96-foot house.

Start-up costs
Structure costs (frame, side boa and side walls)
Construction Lab
Plastic (cover for plastic for rows)
Trickle Irrigation
Total Start Up Cc

Annual Costs
Plants
Stakes and string
Fertilizer
Containers
Labor
Misc. (small tools,
Total Annual Cost

Annual Returns a

Receipts 2,000 lbs
Marketing Costs
Total Annual Cost
Net Annual Retur

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