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FINISH HANGING BASKETS IN HIGH TUNNELS

Heated greenhouses may cost growers more, but will high tunnels produce the same high-quality plants? Four researchers investigate.

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MINIMALLY heated greenhouse structures have long been used by the floriculture industry to finish crops. Although finishing hanging baskets in a high tunnel may be profitable due to lower input and capital costs, the high tunnel may be riskier since temperature is not directly controlled, resulting in a more variable market date. Cooler temperatures can affect the finish date. This case study compares plant quality and economics of finishing in a greenhouse versus a high tunnel.

Plant Mixes Are Tested In Heat And High Tunnels

An experiment was undertaken in central New York in 2011 to compare hanging baskets finished in a heated greenhouse with those finished in an unheated high tunnel. The study would note finish date, plant size, flower number and the overall profitability of the crops.

Heated Greenhouses Result in Earlier Finshes

At Cornell, the high tunnel baskets had about the same number of flowers as the greenhouse baskets by May 27. The greenhouse baskets, however, were much larger in terms of their branch spread. Plants in

Petunia Flirtini hanging baskets show the growth in a high tunnel basket (left) and greenhouse (right).

How This Study Was Conducted

The experiment took place at two locations: Cornell University in Ithaca, N.Y., and at a commercial operation in central New York. Both were in USDA Zone 5b.

Choosing Flowers

Pelleted seeds containing both single- and multi-species varietal mixtures were selected for the experiment due to their ease and uniformity of planting. The plants were raised using nearly the same methods and scheduling between the two locations and were seeded on February 15, 2012, in a commercial potting mix. These plant mixes included pellets of:

- Flirtini (*Petunia* 'Debonair Lime Green' and *Petunia* 'Carpet Rose')
- Silk N' Satin (*Petunia* 'Shock Wave Pink Shades' and *Bacopa* 'Snowtopia White Improved')
- Cotton Candy (*Petunia* 'Shock Wave Pink Vein' purple and *Bacopa* 'Blutopia Blue')
- Ol' Blue Eyes (*Lobelia* 'Riviera Blue Eyes' and *Lobelia* 'Mrs. Clibran')

The seedlings were moved into 50-cell transplant flats at the two-leaf true stage on March 5, 2012. On March 28, four plugs per pelleted varietal mix were transplanted into 12-inch hanging baskets. There were 40 baskets per varietal mix. These were hung on the hoop cross pieces of a 20-foot by 74-foot heated greenhouse at a density of 16 square feet per basket.

Temperature, Watering And Fertilization

At Cornell University, the greenhouse temperature set point for heating was 65°F for both day and night. Plants were watered by hand with a complete water soluble fertilizer (21-5-20) at 150 parts per million (ppm) nitrogen.

At the commercial operation, the greenhouse temperature and ventilation were managed with a goal daytime temperature of 80°F and nighttime of 58.5°F. Irrigation was accomplished with a single drip emitter in each basket; plants were watered as needed. Plants were fertilized with irrigation water with 20-20-20 plus micronutrients at 150-200 ppm nitrogen, plus sulfuric acid sufficient to achieve irrigation water pH of 6.5.

Twenty baskets per varietal mixture with the same density and fertilization were moved to an unheated high tunnel on April 8. The other 20 baskets were kept in the heated greenhouse. The baskets at Cornell were grown until May 27, when they were measured to determine plant size (weight), spread of the branches from the center of the container and number of open flowers. During the experimental period, temperature averaged 66°F in the greenhouse and 59°F in the high tunnel.

the Cotton Candy baskets, for example, measured 25 inches from the center when greenhouse finished; high tunnel baskets measured only 14 inches from the center. The larger size of greenhouse baskets may be more appealing to the consumer, but the compact nature of the high tunnel baskets could make shipping and handling easier.

At the commercial operation, the basketswere sold at wholesale auction or on-farm when they were determined to have reached marketable maturity.

Heating Doesn't Destroy Margins

Baskets grown in the heated greenhouse reached marketable maturity about two weeks earlier than their unheated high tunnel counterparts. Greenhouse-grown baskets also received higher prices across all varietal mixtures. The greenhouse baskets brought in an average $9.36, while high tunnel baskets averaged $6.56. Input costs were estimated at $4.59 per basket. In this project, baskets grown in a heated greenhouse gave a gross return of $2.80 more per basket than those grown in a high tunnel, likely due to the earliness to market, as well as a larger plant with more open flowers.

Heating a greenhouse from April 8 to May 14, as we did in this trial, adds to the production costs. Heating costs were calculated assuming a price of $2per gallon of propane (the most common local fuel) and a use of 200 gallons of propane to heat the 2,880-square foot structure from April 8 to May 15. Hanging baskets were assigned 15 percent of the $400 fuel cost, as they represented 15 percent of the total revenue from the heated structure.

To further refine the net return calculations, the greenhouse structure should also be assigned additional amortizable input costs above and beyond the high tunnel structure, namely a heater with a capacity of 200,000 to 250,000 BTUs per hour, an additional layer of polyethylene glazing and a fan to inflate the plastic layers.

High Tunnels Are Low Energy But Less Appealing

Even after calculating fuel inputs, greenhouse-grown flowers in this trial outperformed high tunnel flowers economically. It is important to remember that the data used here is based on one farm during one season, and the vagaries of wholesale prices could dramatically change the above results. High tunnel baskets remain a viable option for Northeast growers who are not risk-averse and seek to minimize inputs. **GG**

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