GROWERTALKS

Features

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High-Tunnel Pansies

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Pansies are a staple of the spring garden, and in central Pennsylvania that generally means planting in the garden in early spring. Those planted out by mid-March typically produce better flowers than those planted after mid-April. But to have 4-in. pansies ready for sale by mid-March, growers need to pot up 128-cell plugs around February 1. And as Northeastern growers know, February production means turning on the heat.

With the cost of energy inputs continuing to rise, heating could soon become the main input cost for these early spring pansies. In an effort to lower or eliminate heating and its associated costs, we explored the possibility of using a fairly new style of unheated greenhouses, known as high tunnels, to produce pansy crops in central Pennsylvania (Zone 5/6).

Procedures

In mid-October, we received 128-cell plugs of pansy Dynamite Complete Mix and Nature Mulberry Shades from Gro-N-Sell of Chalfont, Pennsylvania, and planted them into 4-in. pots using a soilless potting mix (Sunshine #4). The pots were divided into six treatments:

- Traditional greenhouse at 60F (15.5C)—the control treatment
- Unheated high-tunnel house, pots on benches, covered with overwintering cover
- Unheated high-tunnel house, pots on benches, no overwintering cover
- Unheated high-tunnel house, pots on the floor, covered with overwintering cover
- Unheated high-tunnel house, pots on the floor, no overwintering cover
- Outdoors, covered with overwintering cover

We moved the pots to their treatment locations after planting, but didn't apply the overwintering cover at that time. During the fall we watered as needed, but fertilized only once with soluble fertilizer in early December. The plants located outdoors attracted animals (possibly rabbits), and some leaves were eaten. We placed the overwintering cover on the plants early to protect them from further damage. The plants in the unheated high tunnel were covered with the overwintering cover in early December. During December, January and February the plants were not irrigated more than two to three times; those that were covered weren't watered or fertilized at all. A data logger was installed in the unheated high tunnel so that data could be collected on the temperatures near the plants in each of the five treatments.

Results

The control treatment in the greenhouse heated to 60F (15.5C) was about 60F (15.5C) at night and up to 70F (21C) during the day if it was sunny and the outside temperature was moderate. Because of data logger problems, temperature data was not collected every day; however, we have data for a majority of days in both January and February. The temperatures were averaged such that there were average day and night temperatures for each month (Table 1 and 2).

The average night temperature was similar whether the plants were covered or uncovered. The average night air temperature in the unheated greenhouse was about 3 degrees (2 degrees C) colder than the temperature near the plants, and the temperature around the covered plants outside was about 3 degrees (2 degrees C) colder than the air temperature in the unheated greenhouse.

The temperatures on the benches were similar whether the plants were covered or not covered; however, the day temperature of the uncovered plants on the floor was lower than the temperature of the plants that were covered. Perhaps there was enough stratification of cold air near the floor to create the observed difference. In general, however, the overwintering cover had little effect on the temperatures that the plants were experiencing. There was a comparatively small difference between the temperature of the plants on the bench and the floor, suggesting that there was no temperature benefit one way or the other. The minimum and maximum temperatures were calculated, but showed the same trends observed with day and night temperatures.

By the beginning of December the pansies in the control greenhouse were large and perhaps overgrown for sale. Those plants were removed from the experiment. There is little benefit to having saleable 4-in. pansies in December and cutting back and regrowing does not make economic sense.

In mid-March the remaining pansies were evaluated based on the following visual scale found in Figure 1. The quality of pansy Nature Mulberry Shades was good. The plants were generally vigorous and growing well, with some flowering very well. The plants that had been outside and covered did not grow much all winter. The pest damage in the fall slowed the growth enough that the plants grew very little in that environment. Within the high tunnel, the covered plants looked slightly more vigorous than the uncovered, but as is evident in Figure 4 the difference that the cover made was commercially not important.

The quality of pansy Dynamite Complete was good, but the plants, in general, appeared smaller than Nature Mulberry Shades. The flowers on Dynamite Complete were very large and most plants had at least one flower, but the plant mass was less than that of Nature Mulberry Shades. The plants that were outside did not grow during the winter, which was also observed with the Natures Mulberry Shades. The influence of covering plants was not clear with Dynamite Complete, but the plants on the bench seemed to look a little better than those on the floor.

The data in Figures 2 and 3 suggest there was little difference whether the pansies were covered or not. We also found little difference whether or not the pansies were grown on the floor or on the bench. In Figure 5, the covered plant appears larger, but that was not a consistent effect so the importance of covering is not clear.
Making Cents of It

It’s important to note that the plants grown in the high tunnel were grown using no heat, while a normal crop

would be grown at 60F (15.5C). Fuel cost is not the only overhead cost that must be considered. In most heated greenhouses, the average overhead cost is $0.25 per sq. ft. per week (personal communication with R. Brumfield). Styer and Koranski (Plug & Transplant Production: A Grower's Guide, Ball Publishing) suggest that a pansy from a 128-cell plug could be finished in six weeks. Using that information and the $0.25 per sq. ft. per week for the pansies, the estimated overhead cost for a pansy that is ready to sell in a 4-in. pot by the middle of March would be $0.19 per pot.

Overhead information for high tunnels is less available, but Orzolek (personal communication) estimates that an overhead cost for a high tunnel could be $0.05 per sq. ft. week. Assuming our pansy crop was salable by March 15 and it was planted about October 15, that would be a crop time of 20 weeks. The overhead cost for a pansy in the high tunnel would be about $0.13 per pot.

The crop time for pansies in the high tunnel was long, but the labor to maintain the crop was rather small. During warm weather some irrigation was necessary. In the early fall we irrigated perhaps once per week, but during December and January no irrigations were needed. During February we irrigated once or maybe twice, so maintenance of the crop was minimal.

Because the crop quality was very good, the labor minimal, and the overhead costs reasonable, it appears that using a high tunnel for growing crops such as pansies for overwinter appears promising.

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