50° FOR SNAPDRAGONS?

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Temperature manipulation experiments with snapdragons point out that the best temperature for growing the crop may not be near 50°F for the whole life of the plant. Raising the night temperature to 60°F after bright days or growing small plants in 2¼ inch posts at temperatures considerably higher than 50°F for as long as one month previous to benching have resulted in earlier flowering with little decrease in size.

Snapdragons have long been grown cool with night temperatures near 50°F. Experience has shown that especially strong stems, large, well-proportioned flower spikes and good color develop under this system. Snapdragons grown in this way, however, are relatively slow and sometimes an unprofitable crop. Temperature manipulation experiments were started a year ago to investigate the temperature responses of snapdragons, to search for ways to reduce the time a crop occupies the bench, and to improve the size and quality of the plants with existing schedules.

Market experience has indicated that although most markets willingly accept flowers of large size they do not pay premium prices for them. Research has shown that the same price was paid for large snapdragons of "special" grade as was paid for smaller ones of "fancy" grade. In many cases snapdragon growers are producing larger stems than necessary. In most cases, more money per square foot of greenhouse space could be made by producing the size giving the maximum return per square foot rather than striving to produce the largest size possible. In spite of market trends, however, these experiments were directed towards producing as high a grade as possible.

One series of experiments was aimed at trying to determine if the optimum night temperature for growth and flowering depends on light intensity and if larger size or quicker maturity might result from adjusting the night temperature in relation to the amount of light.

For years growers have adjusted day temperatures in relation to the amount of light. Usually on bright days the day temperatures are higher than on cloudy or overcast days. The idea, of course, has been to allow the plant to utilize available sunlight to the best advantage. When high light intensity prevails, higher temperatures allow photosynthesis, greater respiration and, as a result, more growth. When light conditions are poor, photosynthesis is decreased and lower temperatures reduce respiration, thereby conserving the available carbohyrates.

Respiration, which results in a depletion of stored carbohydrates, takes place at night as well as during the day, and is known to depend on temperature (being higher at higher temperatures). It was believed that relatively high night temperatures after dark weather probably would deplete the carbohydrate reserve of the plant. On the other hand, night temperatures higher than 50°F after exceptionally bright days, when the food supply is high, could conceivably result in a high respiration rate with a greater release of energy for growth. A series of treatments were set up during the winter of 1956-57 in which snapdragon plants were shifted to various temperatures depending on the amount of light available during the day. With the aid of a recording light meter arbitrary limits were set up as to the amount of light on a "bright", "average" or "dark" day and the plants were moved accordingly. All plants were grown at 60°F during the day. One group of plants was grown at 50°F every night. A second group was shifted to 60°F after "bright' days but remained at 50°F after dark or average days. The third group was shifted to 40°F after "dark" days but remained at 60°F after "bright" or "average" days. A final group received 60°F after "bright' days, 50° after "average" days and 40°F after "dark" days.

At the time the first group of plants flowered it was evident that temperature shifting had influenced growth. Those plants that received some 60°F nights flowered two weeks earlier than those not receiving any 60°F nights. The plants which had been occasionally placed at 60°F were somewhat smaller than plants grown at 50°F or below, but even at a 3 x 6 inch spacing they were large enough to be classed as "special" grade (the highest S. A. F. grade).

Little or no increase in size or quality resulted from giving 40°F night temperatures after cloudy days compared to growing continuously at 50°F regardless of light intensity.

Increasing night temperatures after bright days cause earlier flowering and resulted in slightly smaller salable stems. The experiment suggested, however, that the practice of reducing night temperatures after cloudy days was not worthwhile. It has been observed by growers that reducing night temperatures during cloudy weather results in larger size and higher quality. It is possible, however, that a 40°F night temperature after dark days and throughout the entire growing season prevented maximum growth while the lower night temperature used late in the growth of the crop, as is done commercially, might have improved size and quality.

On the basis of the above experiment and other tests carried out under growth chamber conditions, it appeared that low temperature might be effective in increasing size and quality if the plants were large but that it would inhibit the growth of small plants. It further appeared that if higher temperatures were used to promote vegetative growth while the plants were small and then the crop finished at the normal night temperature of 50°F or lower, a decrease in time to flower might result without appreciably reducing size or quality.

An experiment to test this was carried out in the spring of 1957. Small snapdragon plants in 2¼ inch pots were subjected to temperatures ranging from 50°F to 80°F for two and four weeks previous to benching at 50°F. The result indicated that flowering could be hastened by as much as six days (for plants flowering in June) without a significant reduction in grade or 11 days with some reduction in grade.

The results obtained from these experiments indicated that the optimum temperature for the most rapid vegetative growth of young plants may be different from those commonly used in commercial production. Further experiments will be necessary before practical recommendations can be made, and additional varieties must be tested as well as planting at other times of the years in order to fully substantiate the results.

No doubt light intensity may influence the response to temperature but it may be practical to grow young snapdragons at relatively warm temperatures and reduce the temperature as the plant grows larger. Growers with small plantings could do this by growing the young plants, previous to benching, with chrysanthemums or other warm-house crops. Further experiments will determine the practicability of the program.

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