Colorado Flower Growers Association Inc.

IN COOPERATION WITH COLORADO STATE UNIVERSITY

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Carnation Growth Rate Follows Solar Energy

by

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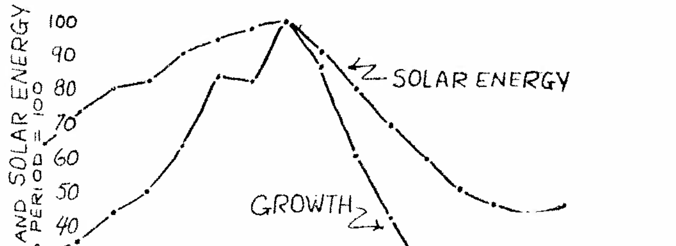
It is well established that light is the dominant factor in regulating the growth rate of plants. Some plants are capable of using all the light they receive while others can use lower intensities only. Using available light, Davidson (1953) calculated the potential monthly growth rate of carnation from pinching to flowering compared to the June rate. By equating available light for all months on the basis of June = 100, he calculated a table of equated days for Rutgers, New Jersey. From his calculations January and December had sufficient light on the average to give 9/30 or 30% of the growth for the month of June.



The first 12 weeks of growth of young Sim carnations compared to the total solar energy received by these plants.

The results from work just completed allow an excellent comparison with Davidson's calculations and point up the relationship between growth rate and solar energy.

120 rooted cuttings of Sim Carnation varieties were planted in 6-inch pots of steamed soil each 3 weeks for 15 months. All cultural factors were kept as near optimum as was possible so that light energy would have its greatest effect on the plants. Each planting was grown exactly 12 weeks. The beginning dry matter in the cuttings was measured from a sample. The dry matter removed by pinching and the final accumulation of dry matter were determined by oven drying. The net accumulation of dry matter was calculated from the final dry weight plus the dry weight of the pinches minus the starting dry weight. The dry matter accumulation was then expressed as a percentage of the starting weight.

The solar energy striking the outside of the greenhouse was compiled for each overlapping 12-week period of plant growth. The period of greatest light and the amount of growth made by the plants during this period were assigned 100. All other period totals of light and growth were calculated as a percentage of this and are presented in the figure.

Note that while light energy decreased to about 45% for the periods beginning in November and December, carnation growth decreased to 15% of the fastest rate. The spread between the curves is probably an indication that factors other than light were limiting the growth rate.

Since this growth curve was calculated for young plants, the chances are good that growth during much of the year was limited by low temperature. Temperatures in the house where these plants were grown were controlled near the optimum for flowering plants. In light of other work which will be published shortly carbon dioxide may also have limited growth during a part of the year.

From this growth curve it is postulated that the growth rate of carnations in Colorado can be greatly increased by finding and eliminating the factors other than light which may limit growth during much of the year. This increase could be as much as three-fold (15% to 45%) for young plants and would be expected to be considerably less for flowering plants.

Literature Cited

Davidson, O. W. 1953. Time required to flower single-pinched carnations. N. J. Plant and Flower Gro. Bul. Vol. 3, No. 5.