Dry Matter in Cut Carnations

By W.D. Holley

The percentage of dry matter in carnation plants or cut flowers is an excellent objective measurement of quality. Plants too low in dry matter are soft, lush in growth, and they usually wilt easily when conditions become unfavorable. If water content of the flowers is too high, the flowers are easily damaged in handling and shipping and they take water with difficulty.

Light is one of the principal factors which causes high dry matter. As light decreases during the fall and winter, water content of the plants increases. It is normal for carnation plants to contain 20 to 21 per cent dry matter in summer and fall and 16 to 18 per cent by midwinter.

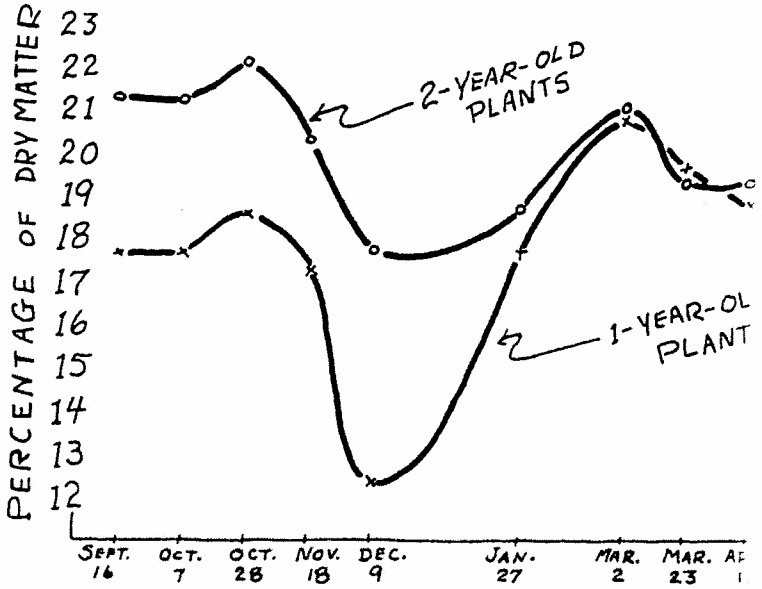

Fig. 1. Dry matter percentages of carnations grown at controlled day temperature regimens between 60 and 65 degrees F.

Older plants usually have a higher dry matter percentage than plants producing their first crop. The graphs in Figure 1 are from Manring's temperature work (1). One and two year plants were grown at four sets of controlled temperatures with only small differences between these temperature regimens. Cut flowers were dried and the percentage of dry matter found at three to four week intervals from September to April. The dip in dry matter percentage in December and January for the two-year plants is normal and was not extremely injurious to quality. The very low percentage of dry matter in midwinter in the cut flowers from young plants may also occur normally, but this level seriously reduces handling quality and cut flower life. Fig. 1 illustrates differences in temperature requirements for young and old plants. When the temperature is below optimum for carnations, leaves broaden, internodes shorten and dry matter percentage decreases.

Irrigation is another environmental factor which has a major influence on dry matter percentage. Plants which are grown wet have high water content. Plants allowed to dry adequately between irrigations have considerably more dry matter.

Winter is a critical period for carnation flower quality. Light is decreasing, and with it dry matter in the flowers. We can accept this normal drop in dry matter by running our houses too cold and watering freely thereby growing fine looking plants with lush appearance and flowers possibly a little too large; or we can do our best to counteract this decrease in dry matter by better temperature management and by extending the interval between irrigations.

Until we have different aged plants in separate sections, temperatures may have to be a compromise. Plants in their first crop have an optimum day temperature about 5 degrees above that of older plants. Optimum day temperatures for older plants are about as follows:

1. Heat to 58-60°F on dark days.
2. Maintain 63-65°F on sunny days.

On occasional warm sunny days a gradual increase in temperature up to 70° probably cannot be avoided. With the additional light on such days, this temperature should not be harmful.

Night temperatures below 50-52°F should be avoided, if at all possible. Low night temperatures cause loss of color in pink and red varieties, and probably increase the tendency of flowers to petal edge burn in handling.

Literature cited

1. Manring, J. D. The effect of solar energy on the optimum day temperature for carnation growth. Master's Thesis. Colorado State University. 1960.

RECENT RESEARCH

From American Society for Horticultural Science Meetings at Purdue Univ., Lafayette, Indiana, presented August 27-30, 1961.

Hasselkus, Edward R. and Gail E. Beck, University of Wis., Madison, Wis. Light transmission and plant response with a rigid plastic greenhouse. An aluminum parabolic arch structure covered with 1/16" corrugated fiberglass reinforced plastic panels was erected in 1958. Adjustable, corrugated aluminum shelves were installed to permit the placement of plants in tiers in order to utilize the light diffusing properties of the fiberglass. Comparisons of light transmission and plant growth were made with a conventional glass greenhouse. An integrating device was developed for measuring light intensities throughout the year at two levels in the fiberglass reinforced plastic greenhouse and in the glass greenhouse. Crops of philodendron, pot chrysanthemum, geranium, ageratum, marigold, petunia, and tomato were grown for comparison in the two greenhouses. Methods of evaluating plant growth and development included days to maturity, height, fresh and dry weight of tissue and leaf area and thickness. Histological studies are being made. Plant response varied among the plants evaluated, but in general, quality plants were produced under fiberglass reinforced plastic. The shelf arrangement in this greenhouse permits the production of two crops in the space ordinarily devoted to a single crop. Lower shelves are limited, however, to the production of plants requiring less than full light intensity.