COLORADO FLOWER GROWERS ASSOCIATION, INC.

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Effects of Summer Pruning on Carnation

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As greenhouse costs continue to rise and the price of carnations remains static we must explore every avenue of either cost cutting or increasing yields per unit of area. One of these alternatives is the growing of plants for longer periods between replanting. If we continue carnation plants in production three or four years, height control becomes a problem. The flowering zone becomes difficult for workers to reach and flowers may be subject to highly variable temperatures as they develop near the greenhouse covering.

Continuous production of carnation plantings for three or more years also leads to marketing problems. As summer replanting is reduced summer production increases. Even with the best cropping controls we know, older plantings tend to produce heavily in summer when energy is high. As summer production is increased the typical low summer prices are depressed even further.

Two practices that reduce summer production to a degree have been used rather widely. Cutting the spring crop to the origin delays returns from these cuts into fall. Pinching smaller shoots low in the plant in April and May also reduces July and August production. But these practices alone are not enough to keep summer production down if we should start growing plants for four or five years.

Since summer pruning to redistribute production on older plants is a feasible alternative in multiple year growing, an experiment was designed to get more information on the effects of pruning on yield distribution and the grade of flowers.

Half of two 105 foot benches was pruned with electric hedge trimmers on June 15, 1972. These plants were two years old at the time and growing in granitic gravel watered by Chapin twin-tube automatic irrigation. One-fourth of each bench was left to grow and flower normally and the other quarter was "pinched" out of production June 15 by breaking off all growths between the stage of early internode elongation and the stage almost ready to disbud. This treatment eliminated production until August 7.

A summation of the four treatments and their designations:

A. Pinched out all elongated shoots June 15.
B. Continuous cutting through third year of growth.
C. Cut-back to high level on June 15.
L. Same as C except lighted dusk to dawn the first two weeks of September.

The height of cut-back on half the plants can best be described as low enough to cut most of the lateral growths. Some laterals — possibly ¼ of them — remained intact below the pruning level. This level must be about midway between two support wires and should be 2 or 3 inches above the base of most shoots that are flowering at the time.

Plots of 25 rows of plants were then marked off within each treatment and the plants on either side of a plot, while treated the same, served as buffer zones between treatment plots. Flowers were cut and graded three times per week. The variety was CSU White Sim. Distribution of yield is shown in Figure 1 and yield and grade by treatments for the year following pruning is shown in Table 1. Figure 1 shows only production from September 11 to June 15, whereas Table 1 includes the flowers produced during 10 weeks of summer for the control (710) and late summer production of 155 for the pinched plants and

Table 1. Yield per square foot and grade of White Sim carnation for the third year of growth — June 15, 1972 to June 15, 1973.

Treatment	Design	Short	Standard	Fancy	Total	Mean grade
A	4.5	19.0	33.8	9.3	65.6	3.73
B	4.1	15.4	36.6	12.8	68.9	3.84
C	3.1	13.6	34.2	11.3	62.2	3.86
L	2.8	11.8	34.6	13.5	62.7	3.94

93 for the cut back — unlighted plants in Treatment C. Cut back plants that were lighted produced all flowers after September 11.

Results

The production curve for the control in Figure 1 is typical for older carnation plants that are cut continuously. The yield for the 10 weeks of summer was 14.1 flowers per square foot or 1.4 flowers per square foot per week. Yield dropped below one per ft²/wk during the fall, exceeded this level from December to May and reached 2½ per week in late May and June. January lighting would no doubt have moved some of this production back into late April and May.

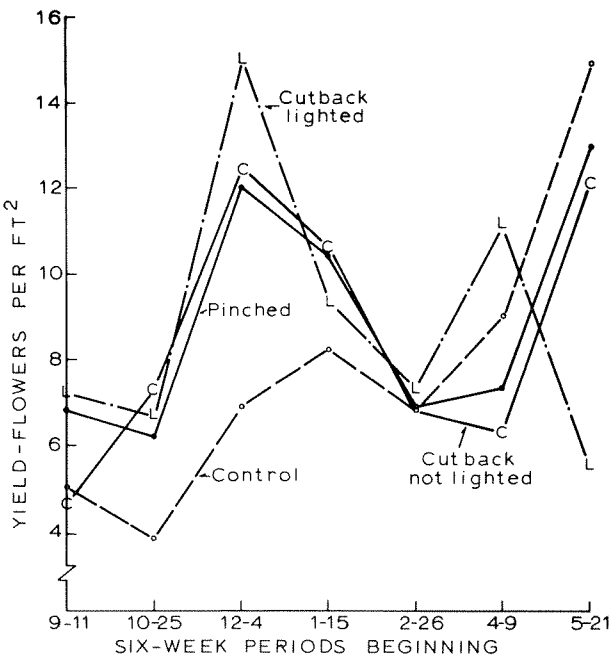

Figure 1. Yield of White Sim carnation during third year of growth.

The curves for the three plots that were taken out of production in summer are similar except that September lighting on one of the cutback plots increased production by about 1/3 flower/ft²/wk during the December 4 period. This September lighting also produced a peak of production for the April 9 period followed by an untypically low production for the late May period. The three treatments that were not lighted reached production highs in the late May period.

Grade of Flowers Produced

Figure 2 shows the effect of the 4 treatments on mean grade of flowers. Again the control curve illustrates one of the pitfalls associated with older carnation plants. While yield is high, the grade of flowers tends to decrease with each additional year of plant age.

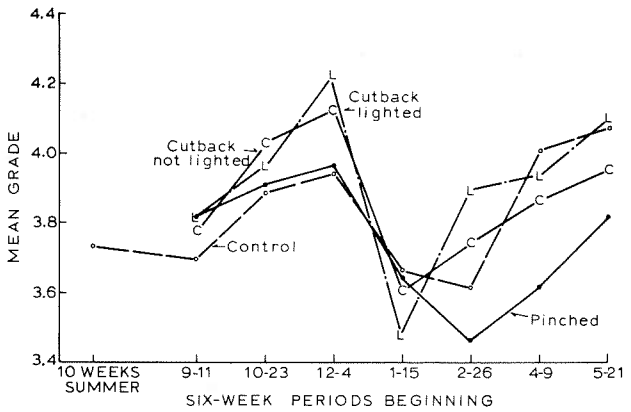

Figure 2. Mean grade of flowers produced on White Sim carnations the third growing season.

All treatments produced extremely low grade flowers in the January 15 period. For some reason Treatment A continued to decline in February and March and remained significantly lower. This plot produced fewer fancy and more short grade flowers during the spring months. The cut back plants produced the best mean grade in November and December with September lighting increasing the grade for the Dec. 4 period and decreasing it for the January 15 period.

Discussion and Conclusions

Hedge pruning of two or three-year-old carnation plants is an effective means of eliminating summer production and redistributing these flowers in the fall-winter period. The heavy winter production that

resulted from June pruning should not be accelerated by September lighting. Rather, lighting could probably best be used in January to accelerate flowering in May.

Temperature control becomes increasingly important as carnation plants become older and taller. Apparently any factor such as higher temperature or lighting that reduces the developmental time for an individual flower shoot is likely to reduce grade of that flower. Not only is it more difficult to control temperature in the flowering zone but temperatures become more critical on older plants. Munoz (CFGA Bul. 267) found that higher flower and stem weight was produced on older plants under low night temperature. While there were more hollow-centered flowers, stem strength was retained to a greater degree at lower night temperatures. The individual grower must adjust his night temperature for older plants by considering flower color, stem strength and flower petalage. While a warmer temperature may produce better flowers, stems may be excessively weak thereby reducing grade.