

# GROWING CARNATIONS FOR TWO YEARS WITH ONE FERTILIZER APPLICATION

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Previous carnation fertilizer studies (Farnham et al., 1973) demonstrated that carnation flower yield (from plants grown in Elkhorn sandy loam ground benches) was the same whether conventional dry feed or a nine-month release rate Osmocote® 18-6-12 was used. Plants that received isobutylidene diurea (IBDU) also yielded similar numbers of blooms. Experiments commenced June 8, 1973, to determine if a two-season release rate of Osmocote® 18-6-12 would provide sufficient nutrients to support a complete two-year carnation crop.

## PROCEDURES

Greenhouse ground benches were fumigated June 4, 1973, and on June 8 were treated preplant with two-season Osmocote® 18-6-12 at 2, 3, and 4 pounds nitrogen per 100 square feet per year. The Osmocote® was broadcast on 3- by 10-foot plots (30 square feet) and raked into the soil before planting. Each fertilizer rate was applied to five randomized blocks. Ninety-six 'White Sim' carnation plants were planted in each 30-square-foot block on June 9. Normal nursery irrigation and pest control procedures were used on all treatments.

The dry feed applications were made according to recommendations by the grower's consulting laboratory. Records maintained for the dry feed program during the previous cropping cycle (Farnham et al., 1973) showed the following nutrients were added per 100 square feet annually over a two-year period: total nitrogen 2.30 pounds, P<sub>2</sub>O<sub>5</sub> 0.76 pound, and K<sub>2</sub>O 1.93 pounds. The fertilizer rates used in the June 1973 experiment are summarized in table 1. Plants fertilized with Osmocote® received no supplemental N, P, or K during the two-year crop cycle. Flowers were harvested and bench-graded by the co-operator between November 1973 and April 1975.

TABLE 1. FERTILIZER RATES USED FOR EXPERIMENTS COMPARING DRY FEED WITH A TWO-SEASON OSMOCOTE® 18-6-12 FORMULATION. 'WHITE SIM' CARNATION PLANTS IN GROUND BENCHES - WATSONVILLE, JUNE 1973

Treatment (lb Osmocote® per two seasons*)	Rates (lb N)		Pounds nutrient per 100 square feet				
	Per 100 sq ft	Per 30 sq ft	Year 1	Year 2	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
A	22.22	6.66	2	2	4	1.4	2.7
B	33.33	9.99	3	3	6	2.1	4.0
C	44.44	13.33	4	4	8	2.7	5.4
X Dry-feed control			2.3	2.3	4.6	1.5	3.9

\* Fritted trace elements were applied at 1 pound per 100 square feet on June 9 and September 15, 1973, February 26 and June 10, 1974, and January 1975.

TABLE 2. CARNATION PLANTS MISSING AT END OF STUDY, MAY 12, 1975

Replication	Plants missing			
	Osmocote® (lb N/yr)			Dry-feed control (2.3 lb N/yr)
	2	3	4	
1	1	15	0	0
2	0	0	0	0
3	0	0	0	3
4	0	25	0	0
5	0	36	0	0

## RESULTS

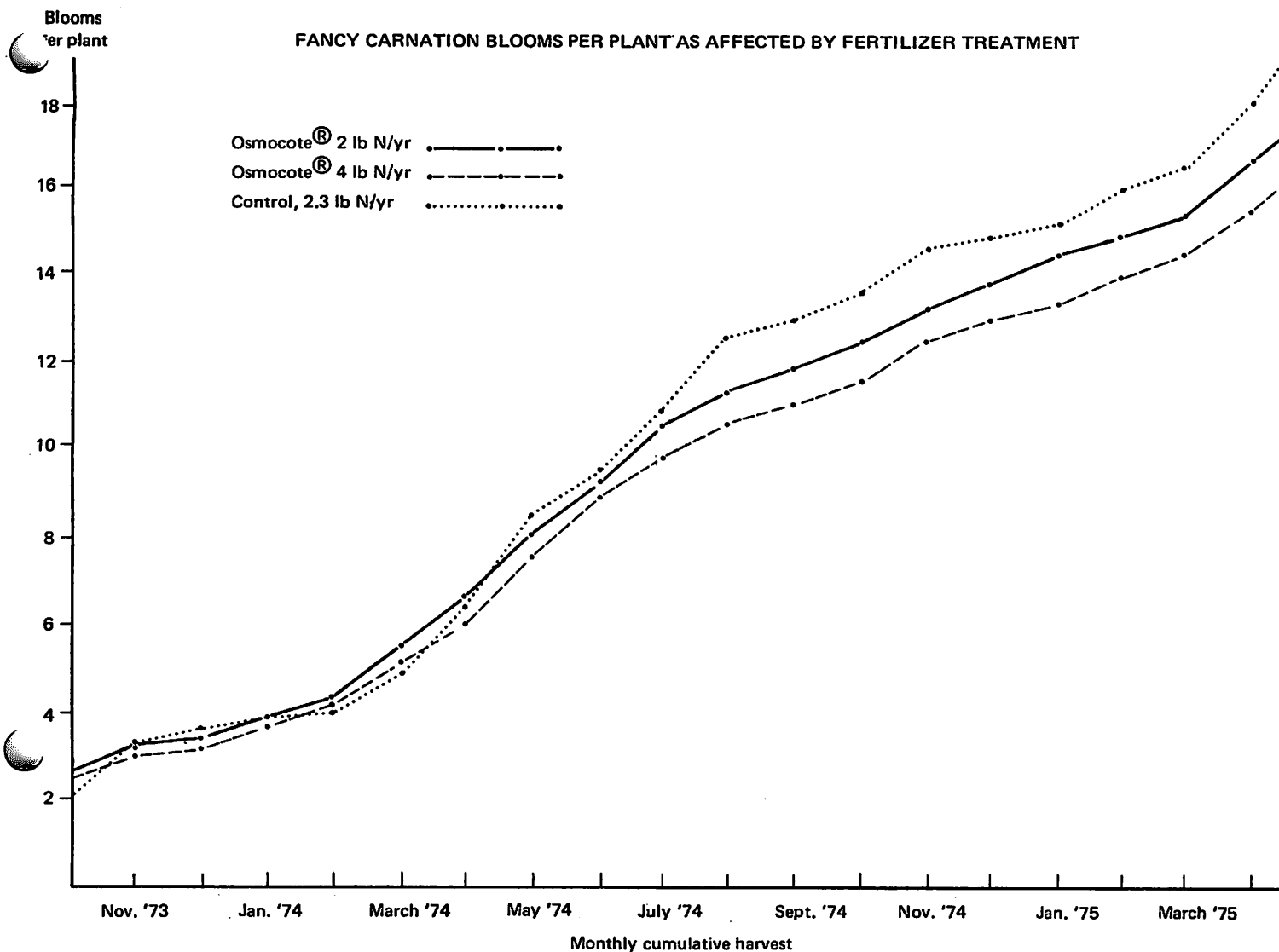
Death of individual plants due to Fusarium wilt during the second growing season (table 2) adversely affected yield. Fortunately, most of the loss was confined to blocks treated with 3 pounds of nitrogen per year from Osmocote® so the data for that rate are not presented in the final graph.

Fancy grade flower yield in the graph is reported as carnation blooms harvested per plant and is expressed as cumulative averages. The two-year Osmocote® 18-6-12 formulation provided adequate nutrition during the first year of plant growth. Flower yield was consistently lower for Osmocote®-treated plants

during the second season. The 2-pound Osmocote® rate consistently out-yielded the 4-pound rate during the same time period. (The 3-pound-rate yield was intermediate between the data plotted for the 2- and 4-pound Osmocote® rates, although numerous plants were dead at the end of the study.)

Flower-cutting practice and time of year have a great influence on carnation yield. Since the yield curves remain parallel after July 1974, possible differences in vegetative shoot development and plant condition during the December 1973 to February 1974 period could account for the flower yield differences. The reduced yield at the 4-pound Osmocote® level may mean the fertility level was excessive during the first winter.

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### SUMMARY

During the first 12 months after planting, two-season Osmocote® 18-6-12 applied to 'White Sim' carnations at 2 or 4 pounds nitrogen per 100 square feet of ground bench per year, i.e., 4 or 8 pounds nitrogen applied before planting, produced flower yields similar to those produced by a conventional dry-feed

program containing 2.3 pounds of nitrogen per year. During the second season fewer blooms were harvested from the Osmocote® fertilized plants than from dry-fed plants. Flower yield decreased as the Osmocote® rate was increased from 2 to 4 pounds of nitrogen per 100 square feet per year.

Yield reduction in Osmocote® treatments was probably due to a number of unmeasured factors that are affected by

salinity and nitrogen level. Growers who plan to use controlled-release fertilizer must consider the economic factors. Labor to apply dry fertilizers periodically must be weighed against the initial cost of the controlled release fertilizer used.

The author wishes to express appreciation to Mr. Frank Shimamoto, carnation grower, Watsonville, California, for providing greenhouse space for the trial and gathering of harvest data.

### LITERATURE CITED

Farnham, D. S., F. Shimamoto, M. Yoshida, R. Hasek, R. Branson, and J. Rible  
1973. Response of ground bench carnations to controlled-release fertilizers. *Florists' Review* 153 (3963): 66-68.