



Colorado Flower Growers Association, Inc.

IN COOPERATION WITH COLORADO STATE UNIVERSITY

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Shipping Tests on Cut Carnations

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Test shipments of cut carnations were made from Denver to Fort Collins during the fall and winter of 1959-60. The flowers were left in the package for 48 hours at 60-70°F, unpacked and placed in warm water, and set in a 33° cooler overnight. Cut flower life was then measured in a 70° controlled temperature room in flower preservative solution. The life of each individual flower was considered past when the petals began losing turgor and turned inward.

Preshipping Treatments

The following preshipping treatments were made and the results evaluated:

1. Dry and precooled. The flowers were cut and placed in a cooler without water until the following day when they were shipped.
2. Four hours in water. Flowers were placed in water after cutting for four hours, removed from water and stored dry in a cooler until they were shipped the following day.
3. Overnight in water. Flowers were placed in water in a cooler until they were shipped the following day.
4. Four hours in preservative solution. This treatment the same as 2 except that a floral preservative was added to the water.

5. Overnight in preservative solution. This treatment the same as 3 except that a floral preservative was added to the water.

In addition, all shipments were duplicated with perforated and non-perforated polyethylene overwraps around the flowers. Twenty-five flowers were used per treatment. Average results for nine shipments are shown in Table 1.

Table 1. Effects of preshipping treatments on life of cut carnations after a 48-hour simulated shipment.

Treatment	Mean life of flowers in days/a
Dry flowers, precooled overnight	7.40
Hardened 4 hrs. water, precooled dry overnight	7.15
In water in cooler overnight	6.78
Preservative 4 hrs., precooled dry overnight	7.06
Preservative in cooler overnight	7.23
Shipped in perforated film (mean for 1125 fls.)	7.15
Shipped in non-perforated film (1125 fls.)	7.09

^{/a} Mean for nine shipments of 50 flowers/treatment -- 450 flowers.

Differences caused by any of these treatments were extremely small. Flowers which had never been in water shipped as well as any other treatment. Perforated film overwrap did not improve on the cut

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flower life in this series of tests.

The variation between shipments was the most striking result pointed up by this series of tests. Mean life of all the flowers in a shipment varied from 4.65 to 9.48 days (Table 2). The grower of the flowers, the shipper, and the weather prior to harvest varied with the shipments. These results indicate a real problem facing cut flower shippers and a possible cause for complaints from customers. Since the product is not standard prior to shipment, shipping probably tends to increase the differences in cut flower life between good and poor flowers.

Table 2. Mean cut flower life of carnations shipped on several dates.

Shipment	Date	Mean life in days /a
B	November 4	4.65
C	November 11	8.40
D	November 18	7.03
E	December 4	9.48
F	December 9	9.16
G	December 16	6.05
H	December 30	8.44
I ₁	January 13	5.24
I ₂	January 20	5.73

/a Each shipment contained 250 flowers.

Storage Treatments

To investigate effects of storage on the life of cut carnations following shipment, a series of tests were completed during the spring and early summer of 1960. The flowers were shipped from Denver to Fort Collins and left in the shipping container for 48 hours. They were unpacked, hardened, and their keeping life measured the same as in the first series of tests. The effects of storage for one and two weeks were under investigation, along with a comparison of perforated and non-perforated overwraps during shipment.

Paired shipments were made from four wholesalers as follows: 300 carnations were cut by one grower and placed in dry cold storage without having been in water. One week later 150 of these were shipped, and the following week the remaining 150 were shipped. With each shipment was sent 50 freshly cut flowers which served as a partial check on the potential life of unstored flowers.

While the potential life in each paired shipment should have been compared with flowers cut the same day as the stored flowers, the mean life for the unstored

flowers gives an indication of fresh flower potential life during this period. Potential life was high through April and May, with a serious decrease on June shipments. On the average, cut carnations lost very little life from one week in storage, considerably more from two weeks in storage.

Table 3. Mean keeping life of cut carnations following one and two weeks of storage compared to fresh flowers cut the day prior to each shipment.

Shipment date	Stored 1 week	Stored 2 weeks	Unstored flowers
J March 31	9.98		10.44
L April 7		8.11	9.20
K March 31	10.38		10.52
M April 7		9.91	10.24
N May 25	8.91		11.38
O June 3		6.25	7.30
P June 8	4.90		5.37
Q June 15		5.46	6.24
Mean	8.49	7.34	8.81

Also under investigation in this series of tests were three hardening treatments following storage and prior to shipment. Table 4 shows the results of these treatments.

Table 4. Effects of preshipping treatments on the life of stored carnations.

Treatment	Mean life in days/a Storage	
	1 week	2 weeks
Dry flowers - no hardening	8.40	7.85
Hardened overnight in water	8.52	7.38
Hardened overnight in preservative	8.71	7.01/b
Shipped in perforated film (mean for 800 flowers)		8.28
Shipped in non-perforated film (800 flowers)		8.01

/a Each mean represents 4 shipments of 50 flowers, or 200 flowers.

/b Hardening in preservative solution prior to shipment decreased the life of flowers in two of four shipments which had been stored two weeks. It did not improve the life significantly as a pre-shipment treatment in any of the tests.

Similar cut flower life resulted whether flowers were shipped in perforated or non-perforated overwraps. With these results from both series of tests, logic seems to indicate that perforated film

must have a separate, but distinct, benefit. That is perforated film should eliminate or lessen the danger of flower spoilage from the action of anaerobic respiration and lack of oxygen. Such spoilage may occur infrequently and, mainly, in hot weather.

Cooperating in these shipping tests were
Callaham Wholesale Florists
Davis Bros. Florists, Inc.
Denver, Wholesale Florists, and
Park-Elitch Wholesale Florists.