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Storage of Cut Carnations With Some Fruits and Vegetables

By Robert P. Wintz 1/

It has long been known that ethylene gas or ethylene-like compounds are injurious to many cut flowers. Ethylene causes sleepiness and premature ageing of carnations. It causes floret drop of snapdragon, bluing of roses and maturity of many cut flowers.

Ethylene or ethylene-like volatiles are produced in appreciable quantities by several fruits and vegetables and by other plant parts. In fact, some research workers have concluded that all respiring plant tissue produces ethylene, although the amount produced varies greatly with the species of plant, the plant organ, and the age of the organ.

Experiments were designed to determine what fruits and vegetables produce harmful substances in sufficient quantities to injure cut carnations or to reduce their useful life. The carnation varieties used in the tests were Crowley's Pink Sim and William Sim.

Twenty-seven fruits and vegetables were tested for production of harmful substances. Each produce item was weighed and placed in a 4-gallon glazed crock along with a small flask holding 3 freshly cut carnations and a beaker containing 40 ml. of 2N KOH. The potassium hydroxide absorbed the carbon dioxide given off by flowers and fruits and prevented an accumulation of this gas. Each test involved at least three crocks or replications. Tables 1 and 2 show results of storage in this manner at 60° F and 75° F, respectively.

Cut carnations were stored at 38° F in 4-gallon sealed crocks with apple, pear and banana. After three weeks at this temperature there were no signs of sleepiness on any of the flowers.

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Table 1. The effects on cut carnations of storage with fruits and vegetables at 60° F.

Fruit or Vegetable	Ave wt. in grams	Average number days flowers survived
(harmful)		
Apple	169	1
Avocado	181	1
Pear	207	1
Tomato	276	1
Squash (sliced, winter)	430	2
Broccoli	842	4
Bell pepper	274	4
Pineapple	907	4
Banana	205	5
Radish (with tops)	210	5+
Cauliflower*	400	6-
Lime	219	7+
Squash (whole, summer)	211	8-
Celery	286	8+
Onion (green)	185	9-
Check		10 or more
(not harmful)		
Cabbage	1044	11+
Grapefruit	473	12
Orange	196	12
Carrot (with tops)	458	13
Tangerine	192	13-
Cucumber	257	14
Grape	384	14
Onion (dry)	318	15
Potato	447	16
Lettuce	461	17
Sweet Potato	335	17

*Mold or soft rot infection developed on all heads of cauliflower tested.

Cut carnations were stored in sealed crocks at 38° F for 48 hours with some of the most harmful produce items. They were then removed from the sealed containers and placed in an open room to determine any ill effects caused by the fruits or vegetables in storage. Apple was found to be harmful and pear slightly harmful (Table 3). Tomato and avocada were not harmful under these conditions.

Table 3. The effects on cut carnations of 48-hour storage with fruits and vegetables at 38° F.

Fruit or vegetable	Ave.wt. in grams	Average days survival at room temperature
Apple	158	4.6
Pear	153	9.1
Check		10.4
Tomato	136	10.9
Avocado	193	10.9

Table 2. The effects on cut carnations of storage with fruits and vegetables at 75° F.

Fruit or Vegetable	Ave. wt. in grams	Average number days flowers survived
(harmful)		
Apple	169	½
Pear	166	½+
Avocado	200	1
Onion (green)	197	1
Tomato	137	1
Banana	162	1½
Pineapple	1038	2
Radish (with tops)	259	2
Celery	331	2+
Broccoli	586	3
Bell pepper	130	4-
Lime	134	4
Squash (whole, summer)	220	4
Lemon	257	5
Onion (dry)	264	6-
Orange	215	6
Check		7 or more
(not harmful)		
Cabbage	624	7
Cucumber	274	7
Sweet potato	279	8-
Carrot (with tops)	603	8
Lettuce	509	8
Potato	392	8
Grape	459	9
Grapefruit	500	9
Cauliflower	431	10

A test of 12 carnation varieties revealed that none of them produced measureable quantities of ethylene gas at room temperature. Flowers of each variety were sealed in bell jars with young African marigold plants. After 6 days none of the varieties had caused an epinastic response on the marigolds.

In the course of this study, several fruits and vegetables used in tests developed molds or soft rots. Usually the diseased tissue produced sleepiness in carnations quicker than that produced by healthy tissue. The mold and soft rot organisms were isolated in pure cultures which were tested for production of ethylene. Cultures of organisms from orange and tangerine caused quick and decided sleepiness in carnations. Cultures from cucumber, cauliflower and radish produced slight sleepiness. Cultures from grape, pineapple, squash and pepper produced no sleepiness.

Over half the fruits and vegetables tested produced harmful effects when stored with carnations at 60° or 75° F. When stored at 38° F, only apple produced enough ethylene to seriously impair the useful life of cut carnations.

The major factors contributing to the production of harmful gases from fruits and vegetables are rate of respiration, temperature, humidity, stage of ripening, and the amount, kind and condition of the fruits or vegetables.

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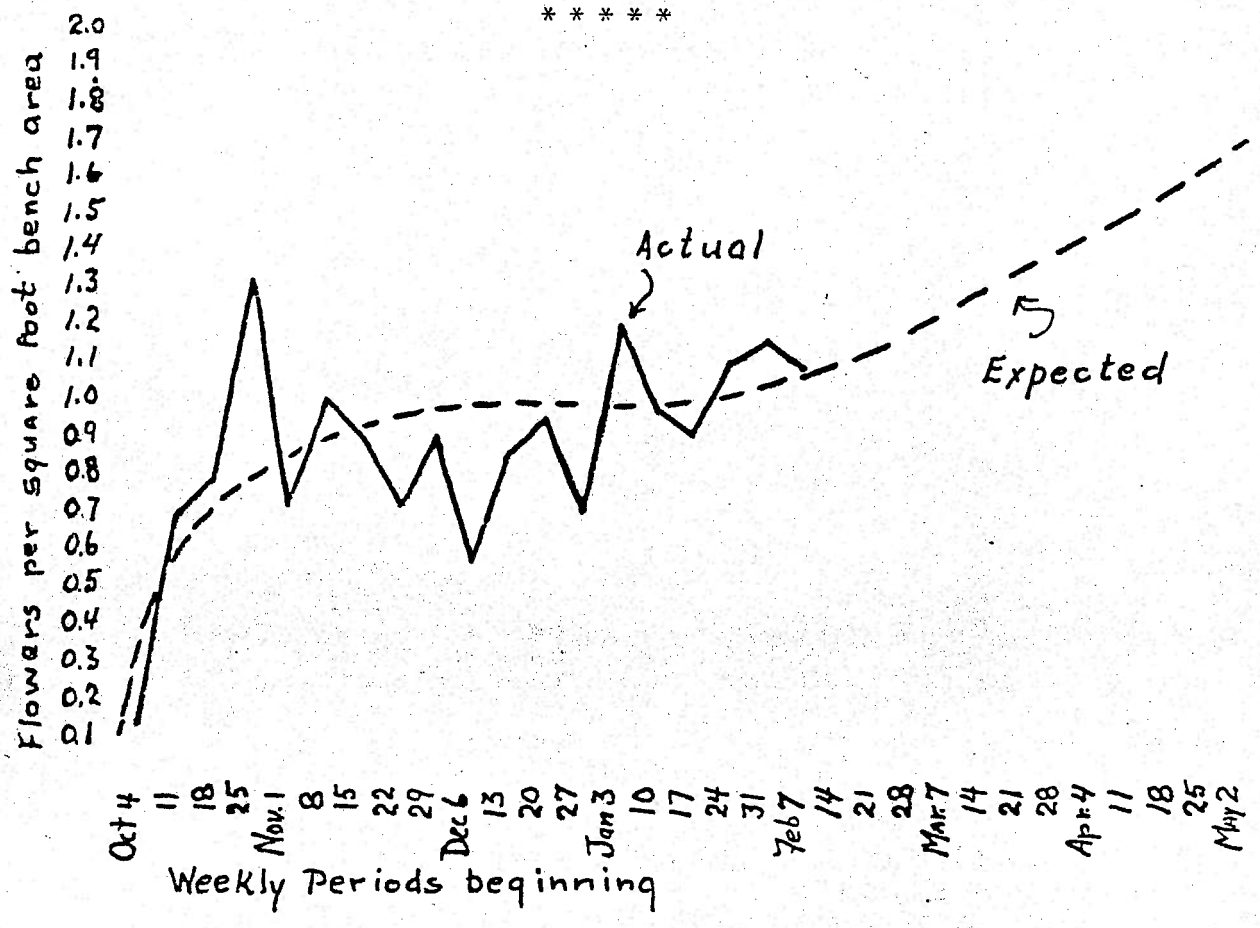

Timing Carnations from a Pinch and a Half

W.D. Holley

Plant growth in the greenhouse is most rapid during the months from April through October. We may take advantage of this fact in developing our young plants and in getting our crops back into production.

The fastest timing of steady production we have been able to achieve has been with Red Sim benched direct as rooted cuttings on June 11. These plants were pinched high beginning July 2. We began pinching the most advanced breaks resulting from the first pinch on August 8, and pinched an average of two breaks per plant during the two weeks following.

These plants began heavy production October 11 and, with slight fluctuations should produce steadily until the end of the season. The plants in this study, including the production of the cuttings on the mother stock, were produced during the April to October period. Four months and 18 days after the cuttings were stuck, steady production began.

The actual weekly production on 112 square feet of bench area and the expected spring production are plotted in the accompanying diagram. As light intensity, temperature, and daylength increase during the spring the production will rise, however this gain should be a steady one.

This planting schedule can be delayed by pinching another break per plant, or it may be shifted ahead for August or September flowers. It will not peak at any given period, but it will not miss any period, once flowering starts.

Your editor,

WD Holley