TEMPERATURE MANAGEMENT AND BUD OPENING IN CARNATIONS

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Carnation growers occasionally wish to harvest unopen buds and hold them in cold storage for subsequent opening. When successful, this procedure has the advantages of meeting peak demands at a holiday and holding buds from a high production/low price period until a more favorable marketing situation occurs.

Carnation bud opening may present the following problems: uneven opening; failure to open; and Botrytis rot during or after storage. During the spring and summer of 1973, we conducted tests designed to seek a way to reduce these problems.

Since ethylene at very low concentrations stimulates bud opening in some plant species, we tested this compound under a variety of concentrations and conditions. The only effect was to retard bud opening. The response was so injurious that we suspected ethylene combined with poor temperature management might be the major problem in carnation bud storage.

A survey was made of five cold storage facilities in Monterey, Santa Clara, and Santa Cruz Counties, where buds were stored, to measure temperature and ethylene concentrations. Temperatures ranged from 32° to 46° F. and the ethylene concentrations from 10 to 100 parts per billion (ppb). The higher the temperature, the higher was the ethylene concentration.

Observations of grower practices showed that buds were usually packed warm, sealed in boxes, and placed directly in storage. Under such conditions, buds in boxes that were closely stacked in the refrigerator so that cold air movement was prevented never cooled to room air temperature.

Three tests were conducted in which 60 buds per treatment were held at 32° and 41° F. in 5, 50, and 100 ppb of ethylene for 3 weeks, then subjected to standard opening treatments. In two of the tests, 5 ppb of ethylene did not affect the buds. In the third, with buds grown during a rainy, cloudy period, even this very low concentration completely inhibited opening of buds stored at 41° F. At 41° F., 50 and 100 ppb of ethylene completely ruined bud opening and Botrytis rot was common. At 32° F., buds opened normally in all three tests at 50 and 100 ppb of ethylene, with only minor amounts of Botrytis. The best response noted at 41° F. is seen in figure 1, where a few buds held in 50 ppb ethylene partially opened. Thus, it is extremely critical that carnation buds destined for storage be cooled quickly to 32° F. and kept there for the duration of storage.

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of inhaling the vapor. Chloropicrin is a fumigant that is highly irritating to the eyes. See your County Agricultural Commissioner to obtain a permit to purchase, apply, and possess these materials, and to become familiar with any special restrictions. Always read the labels before using and carefully follow all safety precautions.

For bud storage we recommend:

1. Have the thermostats in the cold storage area checked to be sure the temperature is maintained at an average of 32° F. without descending below 30° F. when cooling cycle is operating.

2. Use a separate room for cooling.

3. Place a thin polyethylene sheet in each storage box as a liner.

4. Cut and pack the buds in the boxes in the usual way. Move the filled boxes quickly into the cooling room.

5. Set fans to blow across the tops of the open boxes. Continue to operate the fan until the temperature of the buds in the most inaccessible area of the box is 32° to 34° F.

6. Lid the boxes and quickly move them to the storage room at 32° F. Leave 2 to 3 inches of air space between the boxes. Orient the air channels in line with the direction of air movement.

7. Maintain the storage room temperature at 32° F. until ready to transfer the buds to the opening room.

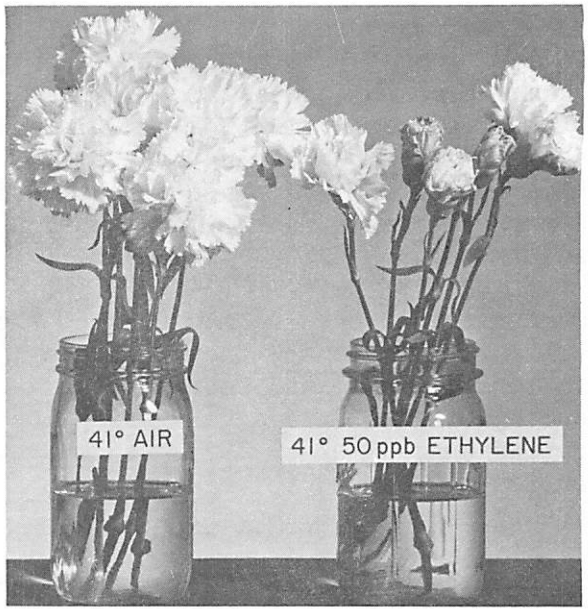

Figure 1. Carnation bud opening as affected by 50 ppb ethylene during storage at 41° F.