Storage Management and NECTARINE SHRIVEL

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Elimination of weight losses during cooling of nectarines lengthened the holding period of the fruit by 50% before shrivel appeared in these tests. Air velocity and relative humidity are the critical factors, but changing requirements from the cooling to storage phases make it inadvisable to use one room for both purposes at the same time.

NECTARINE SHIPPERS have become more conscious of shrivel as increased emphasis has been placed on fruit quality. If shrivel appears in the retail store it can seriously affect salability. This study was conducted to determine the importance of storage management in reducing or delaying the incidence of shrivel. A parallel program to be reported in *California Agriculture*, May, 1963, was conducted to study the effect of various moisture barriers (waxes, curtains, liners) in delaying shrivel.

Water continually evaporates from nectarines. In time, the fruit becomes dull, flabby and finally will show visual shrivel. To delay shrivel, methods must be found to reduce water loss from the fruit. Some of the environmental conditions, including relative humidity and air velocity, which may affect this water loss during storage can be controlled.

The relationship of cooling to storage must be understood in interpreting results. The first step in any storage operation is the rapid removal of field heat, normally accomplished by exposing packed containers to high velocity air at the desired storage temperatures. The warming effect of the fruit on the cold air makes it difficult to maintain a high relative humidity, however. Following cooling, the fruit may then be placed under controlled humidity and air velocity conditions for storage.

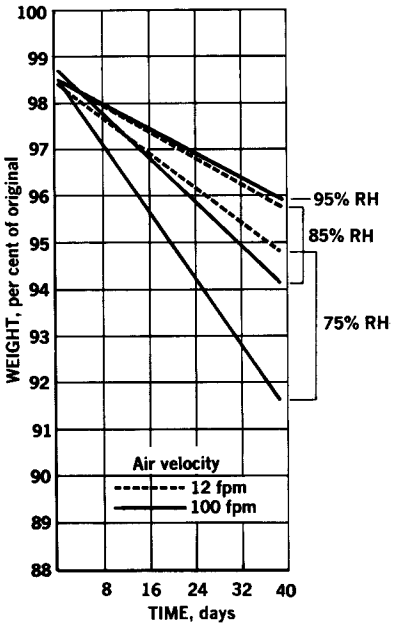
This study was conducted in three cold storage rooms in which the temperature and dew point could be controlled to provide 32°F storage at 95, 85, and 75% relative humidity. The fruit was placed in small air tunnels where the rate of air flow past the container could be regulated. Commercially packed containers were used in all tests.

Results indicated that both relative humidity and air velocity were important under certain conditions. A summary of this relationship is shown in the graph. Air velocity had no apparent effect at 95% relative humidity but was important at 85% relative humidity. At 75% relative humidity, weight loss was severe even at low air velocities.

These results emphasize the importance of maintaining a high relative humidity for nectarines in storage. Under commercial conditions this may be difficult, or impossible, without humidifiers. During recent years several storage operators have maintained a high humidity with sprayer installations. These units utilize air pressure to introduce moisture as a fog directly into the storage room.

Under moderately high (85%) relative humidity conditions, the onset of shrivel may be delayed by a reduction in air velocity. However, care must be taken to avoid "hot spots." These may be caused by lack of sufficient air movement to remove heat leakage into the room, or to remove the heat released by the fruit as a result of respiration.

EFFECT OF AIR VELOCITY AND RELATIVE HUMIDITY ON WEIGHT LOSS OF NECTARINES IN STORAGE AT 32°F



In all of these tests it was found that a large part of the total weight loss occurred during cooling. Visual shrivel occurred when 4 to 5% of the initial weight was lost. One third of this loss may occur during cooling. Elimination of weight loss during cooling would lengthen the holding period of the nectarines by 50% before visual shrivel appeared.

Results of these tests demonstrate the conflict which exists when the same facilities are used for both cooling and storage. During cooling it is important to remove field heat rapidly to minimize deterioration of the fruit. However, the high air velocities often used to expedite cooling can also speed up the appearance of shrivel, if used during storage. Facilities designed for both cooling and storage require great flexibility. Because of the changing requirements, it is not advisable to cool and store in the same room at the same time.

These tests indicate that nectarine weight losses can be reduced and the onset of shrivel delayed by proper handling practices during the marketing phases. However, the straight line relationships found to exist following cooling indicate that handling is equally important at every stage of the marketing process. Thus, each handler has within his control the future condition of the product, and his handling practices affect the time at which shrivel will occur.

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