

Pre-Cool Lettuce

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Keep That
Quality Up

With the cooperation of Arizona lettuce growers and shippers, the Horticulture Department of the University of Arizona has started research on the refrigeration requirements of lettuce. Three phases of tests under way involve 1. Field temperatures, 2. Fan pre-cooling lettuce shipments, and 3. Lettuce storage.

Check Lettuce Temperature

Field temperatures of mature head lettuce were determined at hourly intervals during 24 hour periods in the spring. Dial-type thermometers were used with the metal stems placed at the center of lettuce heads. Readings were taken during four different 24-hour periods, from noon one day to noon the next day, in grower fields just before harvest in the Mesa area of the Salt River Valley during April.

The results of these tests indicate that lettuce is coolest from one hour before sunrise to two hours after sunrise. The lettuce was warmest between 3 o'clock in the afternoon and 7 o'clock in the evening.

Fan Pre-Cooling Lettuce Tested

At the present time, the principle method of refrigerating western head lettuce for shipment to eastern markets is vacuum cooling. This system has resulted in a substantial saving to the shipper over

the previous ice-packing system of a few years ago.

Shippers have become interested in the possibilities of further minimizing refrigeration costs. The University of Arizona has therefore started a series of experiments in which the lettuce is cooled in the car before shipment by powered fans which blow cold air from the bunker salt-ice mixture over the load.

Three fan pre-cooling tests were conducted in the Salt River Valley in the spring of 1954 and future tests are being planned for the 1954 fall season. Companion cars of lettuce from the same fields were vacuum cooled and shipped.

It appears that railroad car shipments of lettuce can be made from the Salt River Valley to eastern market centers by using car fan pre-cooling at one-third the cost of vacuum cooling, but caution and proper conditions are important in fan pre-cooling. To make fan pre-cooled shipments successful, only good, healthy lettuce that is not overmature should be used. Since the car fan pre-cooling process lowers head temperatures only about 1°F. per hour, close attention must be paid to head temperatures at time of loading and to length of time of fan cooling.

Further research by test-car shipments of lettuce is required to determine more effectively the feasibility and limitations of fan pre-cooling for Arizona's different shipping seasons.

Storage Temperatures Important

Results of tests conducted at the Mesa Experiment Station in December, indicate that there was no appreciable difference during storage periods of eight days or longer in the quality of vacuum-cooled lettuce as compared to non-vacuum-cooled lettuce when harvested at head temperatures ranging from 41°F. to 58°F.

During April, storage tests were conducted with Salt River Valley grown lettuce. A temperature of 42°F. is the maximum advisable for lettuce that is to be in transit for 10 days followed by a two-day wholesale period at 42°F. and a two-day retail period at 47°F. However, temperatures above 37°F. are not recommended during longer periods of transit. A temperature of 42°F. is too warm for

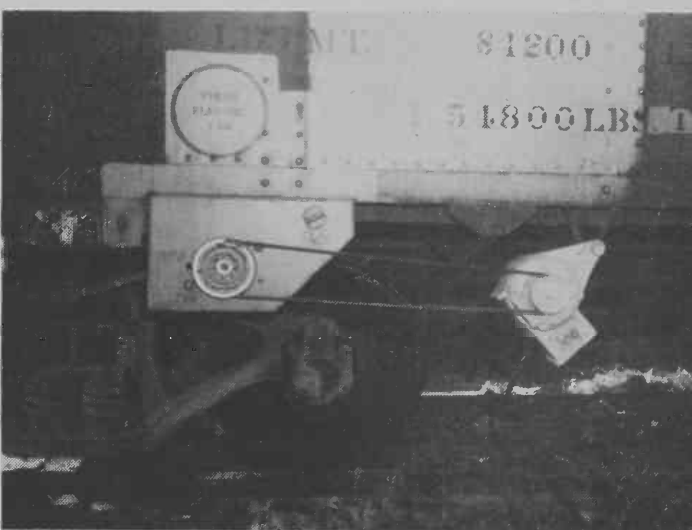


LOADING car of lettuce for fan pre-cooling test. Good ventilation is important.



RECORDING lettuce temperatures in the field. (Marvin Haigler was awarded the Dean Stanley Foundation Fellowship at the University of Arizona in lettuce marketing technology.)

FAN PRE-COOLING power unit in operation after salt-icing of the bunkers.



lettuce that is to be in storage or transit for 15 days followed by a wholesale and retail period. For spring lettuce, 37°F. is the minimum advisable temperature in prolonged storage or transit periods.

The research will be continued in the Salt River Valley on fall and spring lettuce and at Yuma on winter lettuce. The chief objective is to develop basic information on Arizona lettuce marketing technology.

