

TEMPERATURE CHANGES IN THE FUERTE AVOCADO FRUIT FROM TREE TO MARKET

C. D. Gustafson

Farm Advisor, San Diego County.

INTRODUCTION

The Fuerte avocado at certain times during the season, and in certain years, has turned black as the fruit nears the ready-to-eat stage. Some of this dark discoloration occurs at the retail stand requiring the retailer to remove it from the stand and thereby taking a loss. Other fruit is purchased at the store, taken home, and upon softening, the housewife is faced with the discoloration and usually throws the fruit away. This situation has not helped the avocado industry, nor the avocado grower, in creating a greater demand for the avocado. Reports from persons traveling around the United States have indicated that this black discoloration is present in an increasing degree in markets farther away from California.

Blemishes on the fruit such as limb rubs, sunburn, snail damage, insect injury, corkiness, etc., can be explained and certain measures taken to prevent extreme blemishes from occurring. However, the dark discoloration that seems to envelop the fruit starting as a relatively small endspot and then gradually covering a large portion of the fruit has not been fully explained. This discoloration is by far the main reason for losses at the retail store level.

Because of the increased advertising and sales promotion of the avocado during the past two years, it is of utmost importance that the product displayed on the retail shelf be the highest quality. It should bring the highest return to the retailer and the greatest satisfaction to the housewife who has made a purchase because of what she read in an advertisement of the avocado. One of the most important problems facing the industry today is presenting a top-quality avocado to match the good advertising and promotion it is receiving throughout the country.

In December 1962, at the beginning of the Fuerte season, a project was undertaken by the Agricultural Extension Service of San Diego County in cooperation with Calavo Growers of California and two of its grower members, Mr. Charles Crytser and Mr. Jack Zieger, to learn more about what happens to the avocado as it makes the trip from tree to market.

OBJECTIVE

The objective of this first test was to show the temperature changes which take place in the avocado fruit during the commercial handling procedure from the tree to the consumer, and attempt to find out if these changes affect fruit quality.

METHODS AND PROCEDURE

The method used in the tests was to measure the temperature of the avocado fruit at two positions; one, the temperature of the flesh near the seed, and the other, just under the skin. Thermocouples were inserted into the fruit and the temperature read off in degrees Fahrenheit on a potentiometer. Prior to the actual measurement, a schedule was outlined as to what stage of the fruit handling procedure the temperatures would be taken.

It was estimated that an avocado goes through a minimum of ten temperature changes from the time the fruit is picked until it reaches the consumer's shopping bag.

Temperature readings were made at the following stages: (1) on the tree, (2) in the field box (after it had been picked and standing in an orchard for a day), (3) at the packing house dock (prior to being placed in the precooler), (4) when the fruit is taken out of the precooler, (5) at the beginning of the packing line, (6) at the end of the packing line, (7) when it comes out of the holding box, (8) at arrival at the retail store, and (9) numerous readings at the retail store until it reaches the retail stand.

Temperature measurements were made on the fruit "in place," in each of the stages of handling. The fruit tested were placed in two supermarkets in San Diego, one a store in the Food Basket chain, and the other in De Falco's Food Giant chain.

RESULTS

The results of this test was summarized in Chart 1. This was the second of four tests made on the Jack Zieger orchard, formerly owned by Charles Crytser. The results showed that the avocado fruit responds very closely to the air temperature surrounding the fruit. Change is relatively quick and therefore any atmospheric temperature change will affect the avocado fruit. In another test where the rate of heating and the rate of cooling in the avocado fruit was measured, it was noted that within fifteen minutes, the fruit temperature went from 41° F. to 56° F. in an atmosphere of around 67° F. In the test where the cooling rate was measured an individual fruit lost heat in forty-five minutes from 67° F. to about 48° F. Within the next two hours the fruit temperature had dropped to about 42° F. in a cold box reading of about 41°.F.

AVOCADO FRUIT TEMPERATURE CHANGES

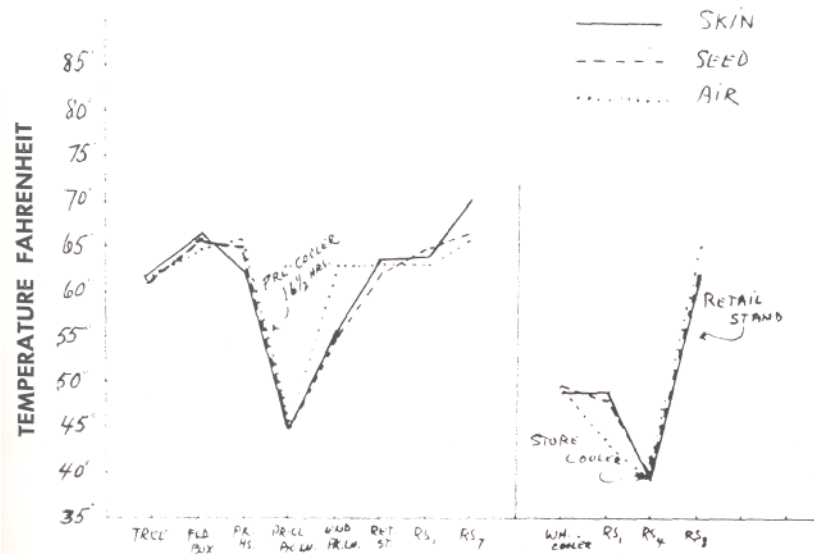


CHART I

Test Dates: Feb. 13-28, 1963

CONCLUSIONS

Conclusions can be drawn on the sensitivity of the avocado fruit. The skin is subject to more temperature changes and more rapid changes than the interior of the fruit. On the other hand, the lag of the interior temperature is slight, and for all practical purposes, the entire fruit can be considered as being influenced by temperature changes. This test provides a basis upon which to continue further studies into what effect varying temperatures have on fruit quality. Further tests are now under way to find out how fruit react if subjected to a continuous high temperature, a continuous low temperature, or a fluctuating temperature between high and low.