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PROTECTING 'HASS' AVOCADO FROM HIGH TEMPERATURES AFTER HARVEST

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Avocado fruit may routinely be held in the field for prolonged durations after harvest. During periods of high temperatures, as commonly experienced during the summer months, fruit pulp temperatures may exceed 100 F when fruit are unprotected. A study was initiated to examine changes in pulp temperature when bins were covered with three different materials: brown wrapping paper, space blanket (reflective side up) and leaves/branches. Three fruit in either the bottom or top of the bin were used to follow changes in pulp temperature throughout the test. The thermocouples were placed in the fruit at the blossom end to a depth of approximately one inch. The fruit were picked in early morning and the test was running by 10:20 AM. The thermocouples were removed from the fruit at 4:00 PM. There was very little variation in pulp temperature between individual fruit for a given position/bin treatment. At the completion of the test 30 fruit from each bin and each bin position were taken back to UCR and stored for 6 weeks at 41 F. After storage the fruit were held at 68 F until ripened (3 days). All fruit were cut longitudinally and scored for both internal flesh and vascular discoloration. Flesh discoloration was scored on a scale of 0 to 5 where 0 was no discoloration and 5 was 81 - 100% of the flesh discolored. Vascular discoloration was scored on a scale of 1 to 4 where 1 was no discoloration and 4 was severe discoloration. There was little difference between treatments in relation to vascular discoloration.

Figures 1 and 2 show the pulp temperature as compared to ambient conditions for both the top and bottom of the bins. Note that the fruit at the bottom of the bins in all treatments were essentially identical throughout the test. On the other hand, note the large divergence in pulp temperatures at the top of the bin. At the end of the test, there was approximately a 40 F difference between the uncovered bin and the bin shaded by leaves/branches. The other two treatments were intermediate, with the brown paper similar to the uncovered bin (but resulting in few sunburned fruit) and the space blanket similar to the leaves/branches.

Figures 3 and 4 show the amount of severe/moderate flesh discoloration (the % of fruit graded a score of 3 or greater) which occurred during storage. At the bottom of the bin the fruit from all four treatments were similar in quality ranging from approximately 7 to 10% of the fruit falling in the moderate/severe category. This makes sense in light of the temperature data. Internal fruit quality from the top of the bin reflects the pulp temperature recorded in the field. There is a marked effect on the percentage of the fruit exhibiting flesh discoloration based on the bin covering. This relationship appears to be directly related to the pulp temperature patterns during the experiment; the warmer the fruit in the field, the greater the amount of internal flesh discoloration. The presence or absence of fruit decay (generally stem end rot) was also recorded. The fruit from the uncovered bin from both positions show a marked increase in % decay, especially from the top of the

bin. Many fruit from this treatment also exhibited symptoms of collapse right below the peel, although an effort was made not to store fruit which were obviously sunburned.

During the summer of 1992 I plan to expand this project to evaluate additional materials which may be suitable for fruit protection in the field. Similar measurements will be taken to compare the relative performance of the various materials.

Figure 1. Changes in fruit pulp temperature in the bottom of the bin as influenced by bin covering.

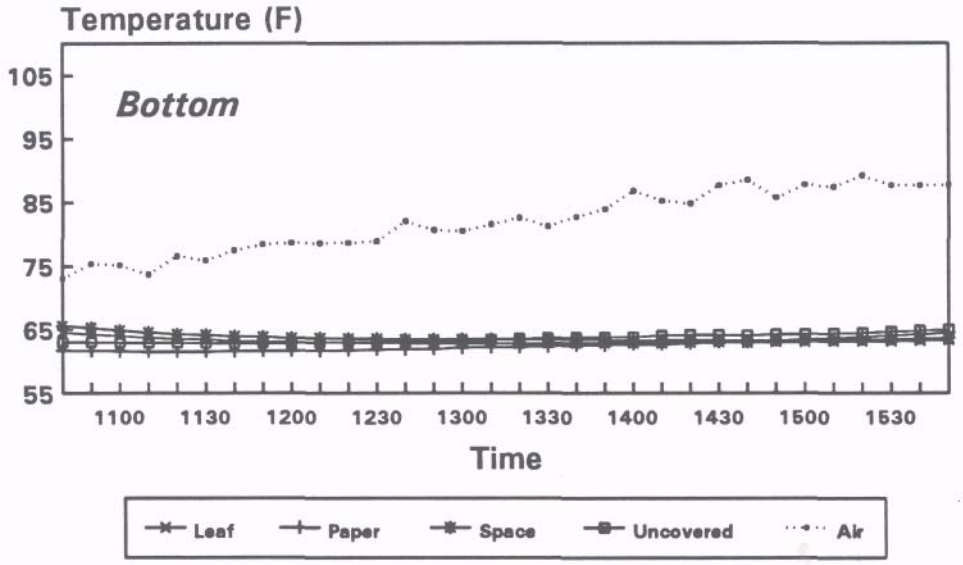

Figure 2. Changes in fruit pulp temperature in the top of the bin as influenced by bin covering.

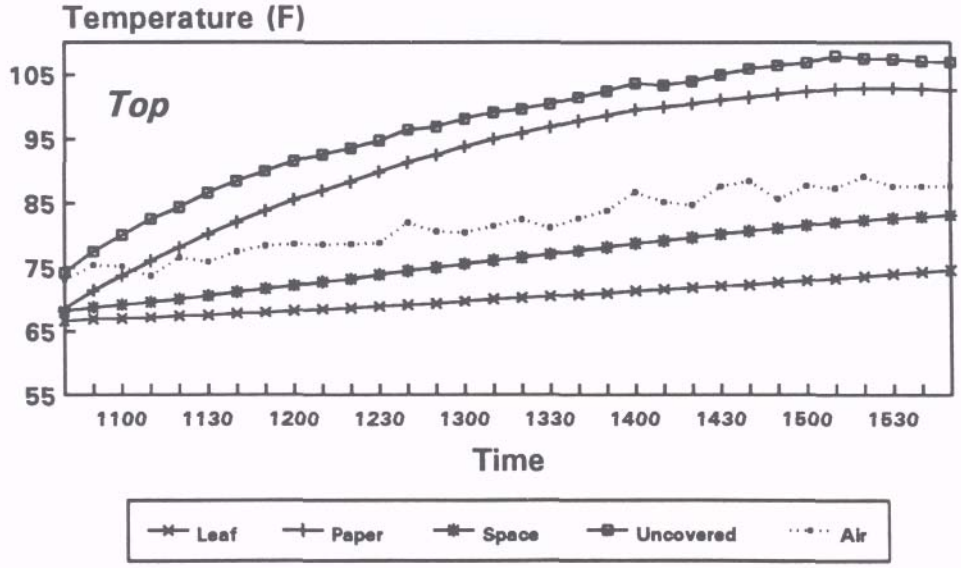

Figure 3. The influence of bin coverings/pulp temperature on fruit quality following storage.

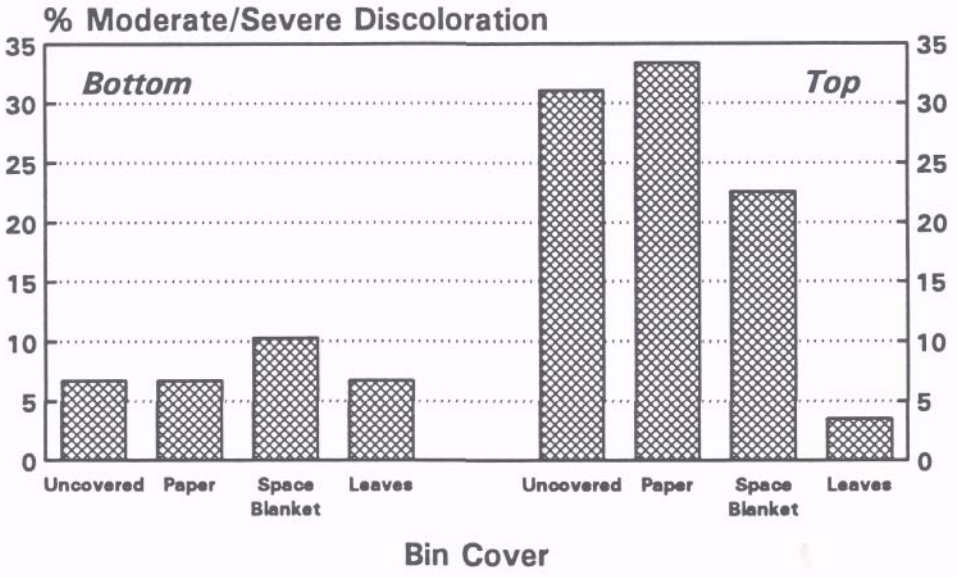

Figure 4. The influence of bin coverings/pulp temperature on the incidence of decay following storage.