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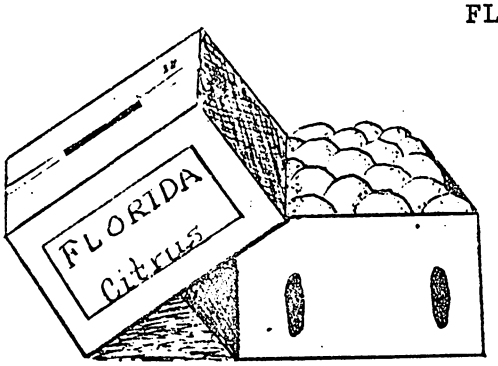
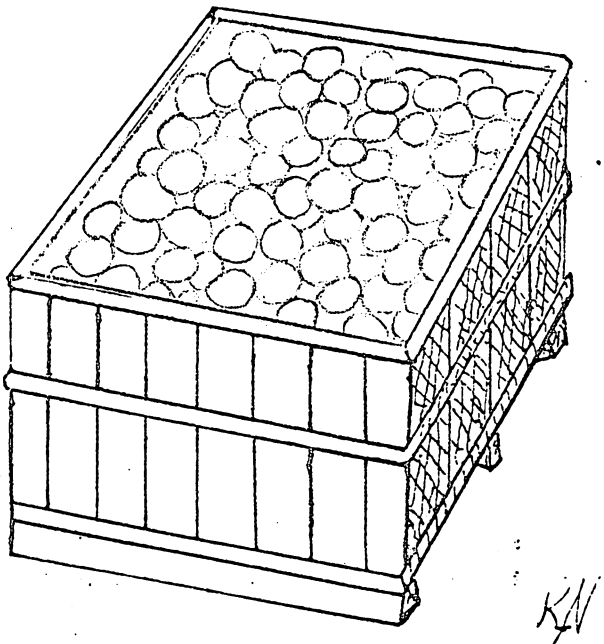
and

FLORIDA CITRUS COMMISSION



Packinghouse Newsletter



Harvesting and Handling Section
University of Florida
Citrus Experiment Station
P.O. Box 1088
Lake Alfred, Florida, 33850

(Complimentary to members of the Florida Fresh Citrus Shippers Association. Others wishing to receive this newsletter, send a dozen stamped preaddressed envelopes to the above address.)

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Harvesting and Handling Section

P A C K I N G H O U S E N E W S L E T T E R

COLOR-ADDED SHIPMENTS TO CALIFORNIA

The following is taken from "The Produce Packager" Vol. 12, No. 23, December 6, 1968. In the absence of any mention to the contrary, it would seem wise to presume that the same rulings could be invoked for color-added tangelos.

"Citrus shippers planning to make shipments of oranges into the State of California are reminded that they must meet the California Agricultural Code regulations requiring the stamping of 'color added' to the oranges. California regulations require that at least 85% of the oranges in a shipment bear the statement 'color added' in legible print. The printing may be 'light', or 'slightly smeared', but must be readable. Two letters missing at either end of the statement is acceptable -- three missing letters at either end is unacceptable.

Within the state, county inspectors may re-inspect the fruit, and if the shipment fails to meet the marking requirements, the inspector may prevent the sale of the fruit in the state on the basis that the fruit does not meet county regulations."

FROZEN FRUIT IS NOT POISONOUS!

We are once again hearing the old wives' tale that frozen fruit are poisonous and, in particular, that the white hesperidin crystals that form between the segments are poisonous. This is simply not so.

Freezing damages the cell membranes to the extent that the moisture can evaporate from the frozen area. Immature fruit that remain on the tree may "heal" to a marked extent, the healthy segments compressing the dried out area into a very small space. Fruit that is mature at time of freezing cannot do this. It will be first mushy and later have hollow areas (but without shrivelling, because the membranes allow the water to escape freely) but it will not be unwholesome.

MECHANICAL SEPARATORS FOR COLD-DAMAGED ORANGES

Installation of Separators

An installation in which a mechanical separator (or separators) delivers fruit direct to the packing lines greatly decreases the out-put of the packinghouse by limiting it to the volume of sound fruit being separated at any given moment. This makes for a very expensive operation.

Packinghouses using fresh fruit bulk bins or pallet boxes should consider running the separators independently of the packing lines. A small crew, working long hours, can accumulate a pool of separated fruit. This "pre-separated fruit" when run through the packinghouse will have a very high pack-out, ensuring a high volume of packed fruit per man-hour of operating time.

Efficiency of Frozen Fruit Separators
(Reprinted, with modifications, from Newsletter No. 4, March 1966).

Three types of separators are in general use. These include two types of water separators; one in which the fruit drops in and separation depends upon both how deep the fruit sinks and how fast it rises; and a more common type of water separator which delivers the fruit under water and separation depends only on how fast it rises. The third type of separator is the chemical or oil emulsion separator which uses an emulsion of oil and water whose specific gravity is adjusted to be between that of the good fruit and the frozen fruit. In all these, of course, separation is based on the fact that the specific gravity of the frozen fruit is typically less than that of the non-frozen fruit.

No marked differences were found in the efficiency of these three types of separators. Instead, the wide differences found were usually accounted for by one or more of these three factors:

1. Convenience and ease of operation of equipment.

2. An intelligent operator giving his full attention to sampling of fruit and adjustment of the machine.

3. A well-arranged sampling station convenient to both fresh and cannery fruit lines, with the controls of the separator convenient to this position for systematic and nearly continuous adjustment.

To make such adjustments effective, the controls should not only be accessible from the sampling position, but should have some form of marking (on mechanical controls) so that settings could be recorded and reused. A great deal of bad fruit separation resulted while operators were trying to readjust controls to a previously known position. Also, a continuous written record should be kept. This is not only useful for management, but also enables the operator to do a much more efficient job. For water-type separators, the control on the selector vane can be on an arc with numbered holes. For emulsion-type separators, the hydrometer reading substitutes for a mechanical setting position on the controls.

No one can keep accurate records without some special set-up. Fig. 1 shows a simple sampling station that is very inexpensive to make and it will pay for itself in a very short time. Note that it is at a position at which both the cannery line and the packinghouse line can be sampled simultaneously. Fruit should be taken alternately from one line or the other until a sample (usually 10 fruit from each) has been taken. Then, when the fruit are cut for sampling, the "cap" cut off the stem-end is set aside and when the grade is known it is put in the appropriate tray. Once the samples have been all cut, then the operator can dry his hands, count the caps and record on his sheet. This device is very simple, but it is extremely helpful. We urge

everybody running a separator to make such a sampling station.

A great deal of unnecessary mess, waste and inefficiency has been observed in the operation of emulsion separators. These can be most efficient, but we advise the following measures. To eliminate excessive carry-over of emulsion (which is expensive as well as messy and may be a serious fire hazard in a wooden house after the water has evaporated out of the oil):

1. Chutes should be made of spaced rods with trays underneath to drain back and reclaim the emulsion.

2. Belts carrying fruit wet with emulsion should have wipers of neoprene or similar material on the underside to wipe emulsion into a reclamation system.

3. Water eliminator rolls can also be used for emulsion reclamation.

4. Reclaimed emulsion should be drained back through a strainer system, usually the strainer at the side of the machine can be used.

5. Fruit should be thoroughly rinsed before going into the house.

6. A special warning is offered against allowing this oil emulsion to get into any other solution, especially Dowicide A-hexamine or equivalent. This could result in excessive residues of fungicides and perhaps a fruit burn.

Specific Gravity Control for Emulsion Systems

Probably because of the lower initial cost, oil emulsion systems are increasingly common, but can be a trial if not well organized. In particular, the system of pumping out into barrels and then pumping in emulsion or water is difficult to control, messy, wasteful and inefficient. A very simple control system was devised consisting of a centrifugal pump, separate from that used for the circulation of the emulsion, and six valves. This is shown in Fig 2. Note that two storage drums or two storage tanks are used, one of which starts partially filled with the concentrated emulsion and the other starts partially filled with water. Emulsion is pumped from Y to Z and then from X to Y to raise specific gravity. It is pumped from Y to X, then Z to Y to decrease specific gravity. This is done by the operator standing at the sampling station. This "switchboard" need not be in close proximity to the separator tank. We stress that it should be near the sampling station.

This type of set-up has been used very successfully to separate not only frozen fruit but also granulated Valencias, sunburned Murcotts, etc., thus making it possible to run crops that would otherwise have been impossible to grade.

PUBLICATIONS OF INTEREST

None of these are new, but neither are freezes. Please note that we do not have supplies of these, but copies should be available from the sources indicated. Most of the observations and advice given above are based on a study published after the 1957 freeze.

"Evaluation of mechanical separators for cold-damaged oranges", Proceedings of the American Society of Horticultural Science, Vol. 73, 1959, pgs. 278-287, by W. Grierson and F.W. Hayward. This is long since out of print, but we could run Xerox copies at 10¢ per page ($1.00) for anyone interested in the original observations behind these recommendations.

"Specific Gravity as a Means of Estimating Juice Yields of Freeze Damaged Valencia Oranges" by Roy G. Stout, Fla. Agr. Expt. Sta. Circular S-150, March 1944. Available from: Bulletin Room, Rolfs Hall, University of Florida, Gainesville, Florida, 32601.

"Pooling by Florida Citrus Cooperatives Following the 1962 Freeze" by Fred E. Hulse, J.R. Meitin and H.G. Hamilton, U.S.D.A. Marketing Research Report No. 764, July 1966. Available from: Fruit and Vegetable Branch, Farmer Cooperative Service, U.S. Department of Agriculture, Washington, D.C. 20250.

Quote: "A personal interview with the manager or financial officer of each of 37 Florida citrus cooperatives provided a complete picture of the business activities of these organizations during the 1962-63 season. The number of boxes handled, the on-tree value of members' fruit and the services rendered by the associations were obtained, along with a record of each pooling system and any changes made in the pooling operations as a result of the freeze.

Although this study examines the pooling practices of Florida citrus cooperatives as they were affected by the 1962 freeze, much of what was learned could apply to other circumstances involving crop damage".

"Separators for Frost Damaged Oranges" by R.L. Perry and R.M. Perkins, Calif. Citrograph, Vol. 53, No. 8, pp. 304 et. seq. June 1968. Available from: Prof. Russell L. Perry, Department of Agricultural Engineering, University of California, Riverside, California, 92502. (This is a highly mathematical analysis of the theory of operation of water type separators).

Dr. Marion F. Oberbacher

Readers personally acquainted with the staff of the Harvesting and Handling Section will regret to hear of the death of Dr. M.F. Oberbacher. "Obie" was one of the Florida Citrus Commission research scientists at Lake Alfred from 1957 until last year when he went to Texas A&M to head a new post-harvest physiology laboratory. Throughout a five months long battle with cancer Obie showed a courage, gallantry and good humor that will forever remain an inspiration to those who knew him. His widow, Betty, has asked that anyone who would have sent flowers to please send an equivalent donation to the American Cancer Society.

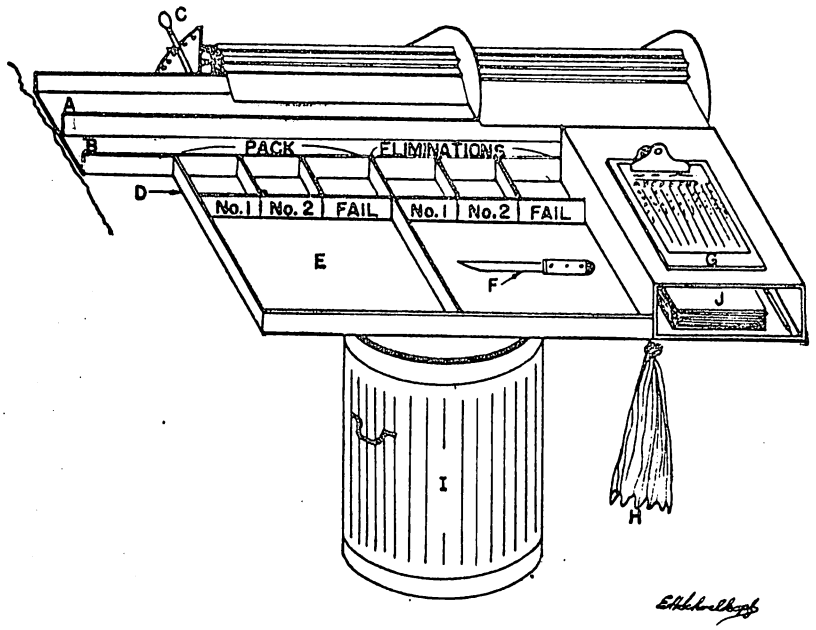

Fig. 1. Design for an efficient sampling and regulating station. "A" Packinghouse line. "B" Eliminations. "C" Remote control on selector vane with numbered settings. "D" Trays for tops off fruit kept as tally. "E" Cutting board for fruit from packinghouse line. "F" Cutting board for fruit from elimination line and sharp knife. "G" Clipboard with record sheets. "H" Towel for operator to wipe hands before recording data. "I" Garbage can (or cull chute) for cut fruit. "J" cupboard for supplies (record sheets, pencils, hone for knife, etc.).

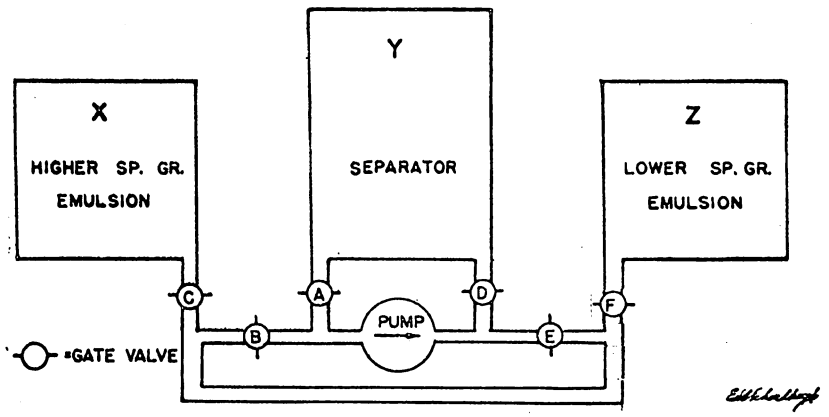

Fig. 2. An efficient apparatus for emulsion regulation.

To raise specific gravity:

1. Open only A, E, and F, pump emulsion from Y to Z.
2. Close A, E, and F, open only C, B, D, pump emulsion from X to Y.
3. Close B and C, open A and D and separator is then on recirculation.

To lower specific gravity:

1. Open only A, E, C, pump emulsion from Y to X.
2. Close A and C, open only F, B, D, pump emulsion from Z to Y.
3. Close F and B, open A and D and separator is then on recirculation.