

Citrus Maturity and Packinghouse Procedures

"Worldwide, all fresh produce is either at, or approaching, a critical period of transition. Competition from processed and synthetic products necessitates ever-increasing quality standards for fresh horticultural produce on the retail market. This is at a time when soaring costs, dwindling labor supply, multiplying legal barriers, and consumer eccentricities are making traditional methods difficult or obsolete. Commercial survival for most types of fresh produce depends on a continuous reexamination of traditional methods from field to table."

"Handling and packaging of produce to ensure maximum quality to the consumer involve consideration of biological differences often unperceived by the engineer and engineering applications often misapplied by the biologist; and both aspects are often ignored by the economist and merchandiser. . . . Only too often, the various skills are applied independently .

" . . . Quality is apt to suffer because the businessman, be he farmer, packer, shipper, transporter, wholesaler, or retailer, is too often concerned only with his stage of the operation, competing with others in the economic chain to increase his share of what is tending to be a decreasing total expenditure on fresh fruits and vegetables. Every unsatisfactory purchase increases the pressure towards use of canned, frozen, dried, or even synthetic products.

Physically, quality maintenance starts in the field or orchard. Financially, it is evaluated in the fresh produce departments of the grocery stores on which we are all dependent, businessmen, engineers, and scientists alike. Although it is not a popular thought, . . . this makes us all expendable Per capita consumption of fresh fruits in the United States has decreased from 108.8 lbs [49.35 kg.] in 1950 to 8 lbs [35.55 kg.] in 1970, a steady decrease of 1.4 lbs (0.64 kg.) per year

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" . . . Selection of a handling and packaging system to maximize market quality of living produce should take the following questions into account:

1. What type of life cycle is involved?
2. Which constitutes the major hazard: physiological breakdown or pathological attack?
3. Is the product going directly to market or is a protracted storage necessary?
4. Is it susceptible to chilling injury?
5. Is the product ready for market in the form in which harvested?

All these questions must be answered before proper handling and packaging methods can be determined. . . . Failure to consider any or all of the above questions may result in 'Good quality in, garbage out.'"

The foregoing comments, excerpted from a talk by Grierson at a meeting of the International Institute of Refrigeration in Jerusalem, 1973, provide the broad background under which Florida's fresh citrus fruit industry must operate. Part of the response to the challenge for the consumer's dollar is a gradual shift towards specialty fruits, which are much more fragile and difficult to handle or ship but have the requisite external and internal qualities demanded of a fresh dessert or salad fruit. These fruit are relatively low volume, high mark-up items. Oranges and grapefruit are in direct competition when shipped fresh with processed products. Oranges in particular benefit from a curing period at high temperature and humidity to enable the minor abrasions and cuts incurred during rough handling by pickers to heal and thereby reduce losses from penicillium molds. Florida oranges lack the deep color and good keeping quality of those from California but have ample juice and high sugars. Grapefruit are less sensitive to rough handling but are susceptible to chilling injury, a matter of great concern to exporters. There is a substantial market for oranges and grapefruit shipped as high volume, low mark-up items with minimum handling, which, however, must be done properly. Numerous improvements in handling methods, packinghouse design and equipment have been made in the

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past few years and more will be made in the future to cope with market demands and regulatory requirements. The concept of "reverse eliminations" where fruit are sent to the cannery and those suitable for fresh shipment are diverted to a packinghouse instead of the present inefficient opposite system, better packaging systems and standardization of containers and carriers throughout the entire chain from packinghouse to retail store are some of the more obvious steps which must be taken if the fresh produce industry is to remain viable. All of these, however, will essentially be wasted until a concerted effort is made to improve harvesting procedures. Picking citrus fruit by hand ranks a close second to sugar cane cutting as the hottest, dirtiest, meanest job in agriculture. Present methods of mechanized harvesting are not suitable for fresh fruit largely because of extensive peel damage which renders external appearance of the fruit unacceptable to consumers. Fresh fruit packers and shippers must, however, face up to this problem sooner or later and seek economically feasible ways of removing fruit from the tree with the care they require. (Utter chaos would reign if there were a ban on all fungicide treatments for citrus, as some groups have suggested.)

A summary of important considerations, fruit procurement, fruit handling basis, products, transportation to market and methods of sales is presented in parallel columns for fresh fruit (packinghouse, gifthouse) and processed fruit (cannery) in Table 12.

Table 12

	<u>Fresh Fruit</u> (Packinghouse, Gifthouse)	<u>Processed Fruit</u> (Cannery)
<u>Important considerations:</u>	Fruit quality (appearance, palatability) Packout (boxes handled vs. boxes shipped) Efficiency of handling (mechanization, kind of fruit, type of house annual volume, house age) Market requirements	Fruit quality Efficiency of handling Market requirements
<u>Fruit procurement:</u>	Own groves (including grower cooperatives) Fruit buyers (fast disappearing)	Own groves (including grower cooperatives) Fruit buyers Participation contract Spot contract Packinghouse eliminations
<u>Fruit handling basis:</u>	** Volume box (1-3/5 bu. equivalent) Weight Box (90 lb = 40.8 kg for oranges, etc.)	Weight box Pounds-solids Pounds-juice
<u>Products:</u>	*Cartons, bags, wirebound boxes Gift packages: cartons, boxes, baskets; bags (local sales)	Frozen concentrate (orange, grapefruit, blends, tangerines) Chilled juice (orange-grapefruit, blends) Single-strength juice (oranges, grapefruit, blends) Sections and salads (frozen, chilled, canned)
<u>Transportation to market:</u>	*Truck Rail (refrigerator car-minor in Fla.) UPS, etc. (gift fruit) *Piggyback Boat (export)	Truck Rail (refrigerator car) Piggyback Boat (export)
<u>Methods of Sales:</u>	*FOB *AF (Auction) (Consignment) Direct (local) Direct (Gift fruit)	FOB Futures (frozen orange concentrate)

*Most important.

**Actually measured in field boxes = 2.23 bu.