Rapid Pack System for Oranges

designed for lemon packing and adapted for oranges, method is essentially a result of long term motion and time analyses

Roy J. Smith and Haruo Najima

A new method of packing oranges—called rapid pack—was in operation during the 1957 season on a citrus ranch near Santa Paula.

In the first successful demonstration—designed for lemons and transverse sizers some years ago—the fruit was carried by a conveyor belt in front of the packer. From the edge of the belt the packer could pick off two handfuls of fruit at a time and place it into the carton positioned between her and the belt. One feature of the system called for the packer to be seated.

About a year ago it became apparent that a satisfactory development of such a method was needed in the orange industry using the standard orange sizer, so studies were started on a rollboard and baffle system for use with the standard sizer. Previous elaborate studies had failed to work out a satisfactory solution but after a series of experiments a successful method was achieved.

The rapid pack system in use at Santa Paula represents further refinement of equipment. One side of one sizer was rebuilt. The sizer was raised and the front of the bins replaced by a rollboard. The carton to be packed is placed directly in front of the rollboard and the packer reaches across the carton to edge of the rollboard, takes two handfuls of fruit and places it in the carton.

The long reach and body turn required by the old system is eliminated and time required to pack a carton is materially reduced. The work is much easier. An important reduction in cost has been achieved and more is anticipated.

The one specification that must be adhered to very closely is height of rollboard edge from the floor. The height at Santa Paula is 41" and seems to be about right. The far top edge of the carton should be just even or slightly below edge of the rollboard.

Standing erect in front of the carton, the packer's elbows should swing clear of it. Also it is important that the elbows not be too far above the carton or the packer will have to stoop to reach the bottom. It is very easy for the packer to reach across for two handfuls of fruit at a time and to quickly fill a carton.

The height specification is of extreme importance as ease of posture is basic to economical operation. It is believed that most packers can work comfortably with the specifications given. For others, whose elbows touch or who have to stoop, some adjustment, if possible, should be made. For short packers, a floor stand can be supplied.

The sizer should be raised enough so that fruit will roll out of the bin and over the rollboard to its edge at the given height of 41". Front of the bin is removed and replaced with a baffle so only one layer of fruit will reach the edge of the rollboard, though fruit can still pile up in the bin making an adequate reservoir available for each size lot.

In designing the baffle care must be taken so that free-rolling fruit will not roll through and over the edge when the rollboard is empty, so that fruit does not jam and so that just one layer of fruit reaches the rollboard edge. The Santa Paula design works in a nearly perfect manner. The baffle is fastened to a slotted board in such a manner as to allow the baffle to be raised or lowered and hence make it easier or more difficult for fruit to pass through. The adjustment may vary for different fruit sizes and degrees of hardness.

Edge of the rollboard needs to be designed carefully. In all demonstrations thus far the last 3½" of the rollboard has been sloped much less than the rest of it; in fact the slope has been reduced to almost level. This change in slope is made in order to raise the front row of fruit a little from the fruit behind and

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General view of rapid pack method of packing oranges at Santa Paula. Girls fold own cartons.

marked holes. This method reduced the planting time by 50%. However, a close follow-up irrigation—by furrow or sprinkler—is necessary to settle the plants.

A good crew is important in the use of the labor transport and once a crew has been trained the men should be kept to work together.

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BUDDING

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that a perfectly smooth union would ultimately be obtained.

The critical height of budding with the various combinations of scions and stocks is unknown but—apparently—8″ should be considered a bare minimum with lemons and probably a greater height would be safer and more advantageous.

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MARKETING

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of supply could not be controlled by the state lemon products marketing order which had been introduced to regulate the flow and price of lemons used in processing. A situation developed wherein the lemon products marketing order was terminated as of September 30, 1957.

The effects of these developments were not limited to the lemon products, but spilled over into the fresh lemon market which has always been the mainstay of profitable earnings for California lemon growers. Canned lemon juice and frozen concentrated lemonade compete with fresh lemons. Studies indicate that, although the demand for fresh and processed lemons combined continues to increase, the growth is absorbed by the demand for lemon juice products while the demand for fresh lemons is gradually decreasing.

However, California has the advantage of being able to ship fresh lemons of high quality throughout the year. A profitable outlook for the California lemon industry depends on the maintenance and expansion of the fresh lemon market. In this respect, the orange and lemon situations are the same; both are tied to the fresh-use markets.

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RAPID PACK

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thus make it easier for the packer to pick up the front row. Front fruit is held in place by a thin strip of wood kept as low as possible, but high enough to prevent fruit from rolling over the edge.

The rollboard must be sufficiently deep so that fruit is free of the baffle and has time to settle into a single layer before reaching the edge.

The carton is seated on a board placed tight in front of, but below, the edge of the rollboard and should be tipped toward the packer enough so that the first row of fruit in it will stay in place.

The waxed slip board system for moving a packed carton to a conveyor used at Santa Paula appears to be very practical.

How much faster a packer can work with the rapid pack system has not yet been determined but studies are being made to determine the rate of pack that may be anticipated.

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SLUDGES

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tions sludges neither appreciably increase nor decrease the water or air content of a soil.

The value of sludges to the grower using containers lies in the fertilizer value. An increase in the air space of an artificial growing mix is easily provided by the incorporation of peat, wood shavings, fir bark or other similar materials.

To determine the feasibility of using sewage sludges in ornamental production, material from a new process in use at Redwood City was selected for trial because—primarily—of the excellent physical conditions of the product. In the Redwood City process, sewage is digested—by standard anaerobic methods—in large closed tanks for 60–90 days before the sludge is pumped into drying basins spread with filtering layers of peat, sand, rice hulls, or wood shavings, either pine or redwood.

After a short period of drying, the basins are rototilled which results in aeration of the sludge and the creation of aerobic biological conditions. Sludge handled in such a manner is well aggregated, light and porous rather than a moist sticky mass. Subsequent new layers of anaerobic sludge can be pumped on top of the tilled material in the basins, and again rototilled two or three weeks later. After a final short period of rototilling and aeration the sludge is ready for use. Digested sludges processed in different ways usually have less desirable physical properties and may be fine and dusty and difficult to wet.

Greenhouse Trials

Sewage sludge—primarily based on peat and wood shavings—from the Redwood City processing plant was tried on chrysanthemums, roses, carnations, and camellias.

In a greenhouse trial with chrysanthemums peat based sludge was added to fine sand in 8″ raised beds at the rate of one half by volume. The mixture was not steam sterilized. An excellent crop of chrysanthemums was grown—in 120 days from the planting of rooted cuttings to flower harvest—without additional fertilization.

The same experiment was tried on greenhouse roses with the exception that the mixture was steam sterilized after the sewage sludge was added. Subsequent growth of the roses indicated that some toxic effects resulted from the steaming. Other observations indicate that steam sterilization of sewage sludge mixtures may result in a hazardous risk of crop damage.

A mixture of 25% sludge—peat or wood shavings base—by volume has proven satisfactory with carnations grown in the greenhouse on raised beds. After-steaming toxicity was held in check by leaching with heavy application of irrigation water at planting. Additional fertilizers and amendments—single superphosphate at four pounds, one and one half pounds sulfate of potash, and 10 pounds of agricultural lime—were added per 100 square feet of plantbed area shortly before planting. No nitrogen fertilizer was added for a period of several months.

In other trials sludge has been used successfully on canned Meyer lemons, camellias, junipers, and daphne with 25% by volume sludge—either peat or wood shavings base—mixed with fine sand. No additional fertilizer was added

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