Labor Field-Transit Machines

planting, thinning, weeding, other hand operations in some row crops facilitated by within-field transportation for labor

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Developed—primarily—for use in vegetable crops, labor transport machines consist essentially of a frame mounted across the rear of a wheel tractor to extend outward far enough to carry several laborers who ride in a prone position and perform such operations as thinning, weeding, trimming and planting. The length of the frame can be varied to carry as many as eight men—one man per row. The beds for the workers can be moved to match the row spacing of the crop. The frame is attached to the power lift of the tractor to permit the operator to adjust its height above the ground.

The tractor is propelled by putting power into the transmission through the power-take-off which permits ground speeds as low as 3′ per minute for extremely slow operations. Power is applied to the power-take-off by either a hydraulic motor fed from the hydraulic pump on the tractor or a mechanical drive from the engine crankshaft. The hydraulic motor is less positive than the mechanical drive and does not produce uniform ground speeds under varying conditions. On the other hand, the ground speed can be varied by altering the flow of oil to the hydraulic motor without changing the throttle setting. With a mechanical drive the ground speed is controlled entirely by the throttle.

Use of a labor transport machine for winter clean-up of strawberry plants resulted in a 60% time reduction. Thinning and weeding of lettuce plantings were accomplished by inexperienced workers with a time reduction of 30% to 40%. During a second weeding of cabbage and lettuce near maturity the men on the transport pulled the weeds and dropped them into the furrow.

The highly specialized operation of transplanting closely spaced crops was performed with qualified success. In strawberries the plants were dropped just ahead of the transport at the exact place to be planted. This required excellent coordination between the dropping crew and the transport to avoid drying the plants. A six man crew—one row per man—moved 30′ to 40′ per minute setting plants 14″ apart.

When planting closely spaced sweet potatoes, each worker of the planting crew held bunches of plants in one hand and with the other hand forced single plants into the damp, sandy soil. An additional man was required to supply the crew with plants although the tractor operator could assist in distributing plants because the tractor follows the furrow.

An auxiliary machine was tried in planting peppers. It consisted of four wheels abreast—one per row—each 2′ in diameter with 3″ cones on the rims. The machine was pulled by a tractor immediately ahead of the labor transport, making it possible for the crew to place the pepper plants in the holes left by the cones and press the soil around the plants before moisture could dry out in the

Row Crop Operations Performed with the Use of the Labor Transport

Crop	Operation	Reduction in time for same operation without transport %	Remarks
Lettuce	Thin & weed or late weed	30–40	Requires steady trained workers to produce maximum savings
Cabbage	Thin & weed	30–40	
Cucumber	Thin & weed	35–50	
Pepper	Thin & weed	25–40	
Pepper	Weeding	35–50	
Sweet potato	Set plants	25–40	Plant markers helpful to workers. Coordination of irrigation behind planters necessary to obtain satisfactory stand
Pepper	Set plants	35–40	
Strawberry	Set plants	30–40	
Strawberry	Winter clean-up	40–60	Removal of old leaves dropped between rows
Soft squash	Harvest	30–60	Operation restricted to relatively short runs with boxes placed at the side of each man

Transport being used for planting. The tractor is driven from the chankshaft back through the power-take-off.

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

Continued from page 7

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

Continued from page 2

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

Continued from page 3

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

Continued from page 13

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

Concluded on next page