SHAKE-HARVESTED GRAPEFRUIT

. . . type of removal

. . . fruit injury

. . . pruning

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COACHELLA VALLEY grapefruit have been successfully shake harvested with a removal rate of 90 to 98%. The inertia limb shaker developed by USDA personnel will remove the most fruit with the least damage when operated in short bursts of five to eight strokes at 325 to 350 cycles per minute, with a 3½-inch stroke at the shaker clamp. Injury can occur to the fruit as it swings against twigs and branches before detachment and as it strikes limbs and twigs during its fall through the tree to the catching frame.

In mature trees the branch structure is already formed and little can be done in the way of branch and scaffold training to reduce damage to falling fruit. However, removal of deadwood will lessen fruit injury (see photos, and cover), and damage can sometimes be reduced even further by the occasional removal of large interfering branches, provided this does not take out so much of the tree that yield is seriously reduced. Tree skirts must be pruned to a height of 2½ ft to allow placement of the catching frame under the tree's canopy.

Counts were made in 1971 and 1972 on types of fruit detachment and the kind and amount of injury. Fruit was harvested in February of each year but the 1971 crop had been treated early in the season with a 2,4-D holding spray to prevent fruit drop. This was a contributing factor in reducing complete abscission and causing increased fruit damage to the 1971 crop. Since this fruit was difficult to detach, it was scarred by being

Grapefruit tree above, and cover photo, showing deadwood removed. Fruit has a much freer fall to a catching frame.

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GROWING PLUMS IN CALIFORNIA. Cir. 563. To be fully productive a plum orchard must be well planned from its beginning, and well managed during its lifetime. The crop also must be properly taken care of after harvest, and this requires knowledge of handling, packing, cooling, and marketing. This publication discusses each of these imporant points. Useful illustrations are included.

whipped against twigs and branches before it separated and fell through the tree.

Types of removal included: (1) plugging, where the button and stem were attached so firmly that they pulled a plug of rind from the fruit; (2) stem remaining attached to fruit after breaking a short distance above the fruit; (3) complete button left on fruit; (4) partial button left on fruit; and (5) complete abscission where the button separated cleanly from the fruit, leaving no tear in the rind. The percentage and type of separation is shown in table 1. Only plugged fruit was unacceptable for the fresh market.

Fruit injury dropped from 27.5% in 1971, to 16.5% in 1972. Most of the reduction in injury was due to the lesser amount of bruised fruit. The bruising consisted mostly of rind deformation caused by the impact on large branches or other fruit. In most cases, rind deformation soon returned to normal with no flesh damage. However, between 1% and 2% of the bruised fruit showed damage to juice vesicles and rupture of membranes which would relegate the fruit to by-products. At the present time there is no way to check on severity of internal damage other than cutting the fruit in half for a visual inspection. The only alternative is to discard all badly bruised fruit.

Punctures and surface scratches which did not penetrate through the rind usually resulted in brown blemishes after fungicidal treatment and waxing. While detracting from visual appearance, interior quality was unharmed. Punctures which penetrated the flesh caused the fruit to be used for by-products.

Types and percentage of injury are shown in table 2. About 10.5% of the fruit had been previously damaged on the tree by wind, sunburn, or insects—to the point of being channeled into second grade or by-product use. Thus, of the 16.5% of the fruit injured by shake harvesting in 1972, only 6% was unsuitable for top quality fresh marketing.

TABLE 1. GRAPEFRUIT SHAKE-HARVEST TYPE OF REMOVAL

	1971*	1972
	%	%
Plugged	1.3	0.2
Long Stem	15.2	5.8
Complete Button	19.2	5.2
Partial Button	60.5	33.3
Complete Abscission	3.4	55.3

*Fruit treated with a 2,4-D holding spray in December 1970.

TABLE 2. GRAPEFRUIT SHAKE-HARVEST TYPE OF INJURY

	1971*	1972
	%	%
Bruised	14.2	5.6
Rind Puncture	5.9	4.5
Flesh Pucture	1.4	1.3
Surface Scratch	6.0	4.5
Conveyor Damage	—	0.6
	27.5	16.5

* Fruit treated with a 2,4-D holding spray in December 1970.

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Grapefruit tree showing deadwood before pruning.

CARNATION

The best treatment of ground beds to control fusarium wilt in these tests was fumigation with methyl bromide. Bromide residues remaining in the soil after fumigation should be removed by leaching with water prior to planting. Where fusarium wilt is severe, as in the test area, annual fumigation is necessary. When large areas are fumigated, there should be less reinvasion from untreated areas.

FUSARIUM WILT caused by the fungus *Fusarium oxysporum f. dianthi* is probably the most serious disease of carnations in California. The principal reason for steam treatment of soil in raised beds is to control fusarium wilt. For many years the causal fungus was spread through infected cuttings, but with the advent of the mother block system using cultured cuttings, this source has been reduced to a very low level. However, once the fungus is introduced into a carnation range, it usually spreads and the grower must either fumigate the soil or go to raised beds and steam treatments. The construction of raised beds is expensive and they also contribute to poor soil water drainage and require more labor than ground beds.

A number of soil fumigants, including SMDC (Vapam, VPM), DMTT (Mylone, Mico-fume), MIT (Vorlex), and chloropicrin - dichloropropene - dichloropropane (Pictel), Terr-o-cide 30-D and 15-D), have been used by growers with varying success. Soil fumigants containing bromide—such as methyl bromide, ethylene dibromide, and DBCP (dibromochloropropane) — have been avoided by growers because of the susceptibility of carnations to bromides left in the soil following degradation of these fumigants.

Field experiments were started to determine which fumigant or combination of fumigants plus fungicidal drenches would give the best control of the fusarium wilt fungus. The experiments were conducted at the Shishida carnation range in Encinitas. The soil was a loamy sand, Elkhorn series. The carnation cultivar Improved White Sim was planted in the trials.