

# Pneumatic Pruning

## orchardists reducing labor costs by using especially designed equipment

E. F. Serr and R. R. Parks

**Labor savings** in orchard pruning—ranging from 20 to 50% in man-hours—are often possible through use of pneumatic pruning equipment.

Such savings are reported by growers who have reasonably good platforms or tower equipment and with trees requiring detailed fine pruning, such as peaches, plums, apricots, pears and in some districts, apples and prunes. Sizable savings have been reported also by growers with figs, almonds, walnuts and grapes.

There were some 60 to 80 rigs in operation in the 1946-47 pruning season and the number increased rapidly to an estimated 400 to 500 by the end of the 1947-48 season.

Good platform or tower equipment is necessary for success with pneumatic pruners. Very few deciduous fruit growers have been successful in using shears from ladders.

Platforms or towers must be built to fit the particular orchards in which they are to be used. Most of those in use are mounted on trucks, small tractors, or trailers. A Napa Valley grower has built several self-propelled units, using one three-to-five horsepower gasoline engine both to run the air compressor and to move the tower through the orchard. Using only one engine lessens the weight of the rig and makes it more easily maneuvered, especially on wet soil. It also helps keep down initial and operating costs. All controls are located on the upper deck which gives greater efficiency in that no special driver is necessary and less time is lost in moving from tree to tree.

A rig developed in Sonoma County, mounted on a small tractor, has a hole cut in the deck for easy access to the driver's seat by one of the two shear operators.

Another rig with hydraulically operated catwalks that can be quickly raised, and lowered and swung at various angles to the tree has been built in Kern County. This unit is now used both for picking and pruning in peaches.

In most cases where growers have tried the pruning equipment without success the reasons have been either unsatisfactory platform equipment, trees too close to permit use of platforms, or lack of skill in operation of shears.

Use of long, power-operated shears from the ground is unsatisfactory because it is hard on the operator to be reaching

upward all the time and he does inaccurate work resulting in too many stub cuts.

When the operator can get up close to where he is making the cuts, a shear of about 24-inch overall length works well. With such a short shear the operator has better control, can make more cuts in a given time with less effort and also can make them at more desirable angles, thus eliminating the objectionable stub problem. The two to three foot shear lengths are gaining in popularity.

The pneumatic shears usually are operated at pressures of 120 to 150 pounds per square inch. About four cubic feet of air per minute are required for average operation of small shears which easily cut limbs up to one inch in diameter. About double this amount of air is needed to operate the larger shears which cut limbs up to 1 $\frac{3}{8}$  inch diameter.

Any mechanism which places the operator out into the tree beyond the edge of the platform increases his efficiency, especially with wide-spreading trees such as peaches, plums and apricots.

A popular method of accomplishing this has been by means of slip-boards, which can be extended out at any angle and to a distance of six or eight feet from

the edge of the platform. This is sufficient to place the operator near the center of the trees in rows up to 24 feet apart.

One rig in Sonoma County has hinged kickboards which are very satisfactory where it is not necessary to get out very far into the tree. These extend out three feet from the platform when in position.

Slip-boards thus far have been hand operated. Power operation of slip-boards or catwalks combined with a self-propelled tower having controls on the deck is probably a logical combined development for the future.

A single stage platform is all that is needed for trees up to 15 or 16 feet in height. These include peaches and apricots, where 10 to 12 foot ladders have been used for hand pruning. Platforms six to 10 feet wide, 12 to 24 feet long and six to 12 feet off the ground are being used in different localities. Eight or nine foot height is most common in the San Joaquin and Sacramento valleys and six feet, in the Hemet Valley.

For somewhat taller trees, such as pears, a two-stage platform works well. For very tall trees such as walnuts, man-sized baskets or crows nests set at appropriate levels on a high tower have been used. Only a few growers are practicing fine pruning on walnuts. Some of this work is being done for leaf wilt disease.

A new tower now under development in the Davis area allows the operator, standing in a basket, to raise or lower himself, extend or retract the supporting boom, or swing in about a 200-degree arc to do either pruning or picking.

Close plantings and heavy soils are obstacles which may limit use of platforms

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**Kickboards can be extended three feet on either side of this pruning platform mounted on tractor. Swing-boards are on the corners; deck height is controlled by the hydraulic system of the tractor; compressor is run from the power take-off.**



## PRUNING

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or towers in some districts. It seems practical to do some cutting back of limbs to allow passage of the equipment, as some growers are now doing, provided too much fruiting area does not have to be sacrificed.

In future plantings trees may well be spaced a little wider in one direction than the other to allow for mechanization. This also would help in hauling out fruit. The difficulty of operating the equipment in muddy soils may be partially answered by light weight and wide, mud-grip tires or multiple-drive wheels.

Good platform and tower equipment now being developed for pruning is also finding use in other orchard operations such as thinning, knocking and harvesting.

Rig has platform nine feet high, 7½ feet wide; slip-boards, 2" by 12", 12 feet long, iron reinforced.



Two-stage pruning platform for pears with slipboards on upper deck. Compressor is mounted on tractor.

In addition to certain savings, results show better timing of work for regularly employed crews, easier and more desirable employment for more highly skilled help, fewer troubles in labor training and management, and better control of quality work.

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## ORANGES

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at all involved in the small size problem as it occurs in the orchards some other factors also bear on it, especially micro-organisms, soil structure and other environmental factors.

Extensive experiments are being carried on in Riverside and Ventura counties studying the effect of soil fumigation on soil organisms, the growth of trees replanted on such soil, and a search is being made for soil fumigants which can be used in orchards without harmful effects on the trees.

The symptoms of poor feeder root systems under trees producing small size fruit have been observed rather generally.

The presence of nematodes on roots of both decadent and healthy trees has been generally observed wherever citrus is grown in various parts of the world. There also are usually several other micro-organisms closely associated with the nematodes.

Enlarged studies of this complex association during the past three years consider the possibility of relationship to slow decline of citrus trees which has gone hand-in-hand with small sizes. This study is important also to the problem of replanting land again to citrus.

Work is well underway studying the effect of rootstocks and varietal bud selections on fruit sizes.

A comprehensive plant breeding project also is underway to produce new varieties and to rejuvenate old varieties by means of nucellar seedlings.

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## NEW PUBLICATIONS

A copy of the publications listed here may be obtained without charge from the local office of the Farm Advisor or by addressing a request to Publications Office, College of Agriculture, University of California, Berkeley 4, California.

**THE PEACH TWIG BORER**, by Stanley F. Bailey. Bulletin 708, September, 1948.

Written for the grower, pest-control operator and the entomologist, this bulletin describes the life history and cycle of this pest. A control program based upon the latest research information is outlined.

**CONSTRUCTION OF FARM REFRIGERATORS AND FREEZERS**, by James R. Tavernetti. Station Circular 386, September, 1948.

This circular suggests several designs to fit farm refrigeration needs. It discusses construction, materials, equipment and costs.

**MAKING A COAT**, by Ethelwyn Dodson and Frances Reis. Extension Circular 145, August, 1948.

Pictorial illustration of tailoring techniques and a step-by-step simplified work plan for construction of the garment are given in this booklet.

## SUGAR-BEET

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sugar-beet nematode in California have not been successful. The reasons are not known but preliminary experiments have been started in an attempt to determine whether soil conditions, or the time of treatment in relation to the stage of the life cycle of the nematode present may account for the failure of chemicals to control the nematode in California.

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