

MECHANIZED HEDGING

close-planted WALNUT

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These two experiments indicate that once walnut orchards become crowded, hedging to allow light between trees is not effective in alleviating the condition. A substantial loss in production occurs initially and, although new growth develops in response to the hedging, it does not result in increased production, or in the restoration of lower fruit wood. Hedging, however, may prove to be a valuable tool in maintaining tree size and production in orchards where the trees have not yet grown together. Work needs to be done to evaluate the effect of repeated hedging where it is started before tree crowding has developed.

RECOMMENDED SPACING for walnut trees has changed during the past twenty years. The common practice had

been to set trees 40 to 60 ft apart (12 to 27 trees per acre), allowing enough space to fully develop the eventual large tree and avoid crowding. Interest in closer spacings occurred when two varieties were interset and the grower was unsure, at planting, which one would eventually be kept.

With the development of new varieties which are compact in growth habit and highly fruitful on lateral buds, closer tree spacing (20–30 ft apart) has become common practice to increase production while the orchard is young. Yields per tree are similar at all spacings early in the orchard's life, thus, per-acre yields increase proportionately to the number of trees per acre.

Close plantings are established with the intention of systematic removal of alternate trees as the orchards become crowded. The size of the "temporary" trees should be gradually reduced over several years by progressive limb removal to avoid a substantial production loss when the trees are removed. However, growers with good production are reluctant to perform the necessary pruning and ultimate removal of temporary trees. The orchards, thus, become crowded, shading develops and production stabilizes or declines. When orchards reach 10 to 15 years of age, declining production becomes apparent as lower fruit wood becomes shaded and nuts are borne only in the tops of trees. This is the situation which appears to be developing in many present day walnut plantings.

The question has arisen as to the feasibility of substituting mechanized tree hedging as an alternative to tree removal to maintain high production of close-planted orchards. Hopefully, this would allow light to penetrate between tree rows and increase nut production. This report describes the results obtained from hedging walnut orchards in two different situations, one where the trees had grown

together into a solid canopy and the other where they had not.

This experiment, conducted in Tulare County, compares the effects of hedging heavily canopied walnut trees with detailed hand pruning, and no pruning, on nut production and quality. Mature Payne walnuts, 13 years old planted 35 by 35 ft offset (25 ft between trees), which had been heavily canopied for four years (see photo) were selected for the test. Extensive shading and crowding had resulted in extensive loss of lower fruit wood and production that had stabilized at an undesirable level. The planting is in permanent border type culture and hedging was performed in one direction.

Mechanical hedger

The hedger was a dual 22-ft, vertical boom machine using seven circular saws per boom (see photo). It was adjusted to cut a 7-ft width at the top of the boom (22 ft high) and 4 ft at the bottom. Overhanging branches not cut by the hedger were removed by hand. Hedging was first done during the 1971–72 dormant season and repeated in the two subsequent years.

Six, one-acre plot replications (42 trees) of the following treatments were established: (1) hedging both sides of tree row each year; (2) hedging alternate sides of tree row each year; (3) hand pruning: 20 to 25 moderate (1- to 2-inch) cuts per tree; and (4) no pruning. Yields were obtained for a three-year period, and Diamond Walnut Growers, Inc., made the quality analyses.

Annual and total production for each treatment is presented in the table. In the first year of the test, hedged treatments produced significantly ($P = < .01$) fewer walnuts than hand pruned. This result was to be expected because of the large amount of wood initially removed by the hedger (see photo). In succeeding years,



Sickle bar hedging machine used in Tehama County trial.

of ORCHARDS

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no significant difference in production was obtained between any of the treatments although hedging produced consistently fewer walnuts than hand- or non-pruning treatments. Nut quality was not affected by any treatment in any year of the experiment.

Hedging did not alleviate shading. After cutting back old fruiting wood by hedging, substantial vigorous new growth developed and the orchard was again canopied by July of that growing season. Rehedging both sides of the row the following dormant season, as in treatment No. 1, removed a very small amount of wood and did not appreciably improve light conditions in the lower portion of the trees. Allowing new growth to remain the following year (treatment No. 2) did not increase production because the one-year-old wood did not seem to attain the high degree of lateral bud fruitfulness characteristic of the variety. Moderate hand pruning in this test did not improve light penetration, or production, as compared with the non-pruned treatment.

Two hedging treatments, both sides of trees in one direction vs. all four sides

of trees, were compared with hand pruning, and no pruning, in a trial near Vina, Tehama County. The walnut trees (10-year-old Vinas planted 25 by 25 ft square) were just beginning to touch and nuts were being produced throughout the tree when the pruning was performed in the 1971-72 dormant period.

The hedger was a 14-ft, double-bladed sickle bar attached to a boom mounted on a wheel tractor (photo). The cutter bar was positioned at about a 30° angle from vertical. No pruning was done below 8 to 10 ft from ground level nor in the top center portion of the tree.

Harvest data was obtained only in 1972, the first season after the differential pruning treatments. There were four replications (40 trees each) of each treatment. No significant difference in yield was obtained between any of the treatments. Nut quality was also unaffected.

The machine pruning produced about as much new growth (2 to 3 ft) from pruned limbs as did the hand pruning. In both cases, the pruning consisted primarily of heading-back previous year's growth on the periphery of the tree. Unpruned limbs, in most cases, grew very little regardless of treatment. Mechanical hedging did not appear to increase crowding between trees. By the end of the summer, trees left unpruned were the most crowded, and production would be expected to gradually decline if crowding was allowed to continue.

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Walnut hedging machine used in these Tulare County trial featured seven circular saw blades mounted vertically on two booms, allowing trimming from either side of the row without turning around.

ANNUAL AND TOTAL DRY YIELD OF PAYNE WALNUTS AS AFFECTED BY PRUNING TREATMENT IN HEAVILY CANOPIED ORCHARD IN TULARE COUNTY

	DRY TONS/ACRE				
	1972	1973	1974	TOTAL	AVG/YR
Hedging both sides of row	.55	1.54	1.06	3.15	1.05
Hedging alternate sides	.69	1.67	.94	3.30	1.10
Hand pruning	1.04	1.70	1.10	3.91	1.30
No pruning	.84	1.80	1.27	3.84	1.28



Walnut hedging, before (left) and after (right), photos at the Robert's-Gregory Ranch, Tulare County. The trees were 13 years old and about 30 ft high.