SELECTIVE PRUNING OF CLOSE-PLANTED ASHLEY WALNUTS

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Objectives: The objectives of this trial are to evaluate any benefits derived from selective annual pruning of a mature, high-yielding Ashley walnut orchard.

Procedures and Results: Selective annual pruning vs. no pruning vs. alternate year grower trimming of a dense Ashley orchard began in 1978. In 1978 the selective annually pruned plots averaged 38 pruning cuts/tree, 32 less than 1\(\frac{1}{2}\) inches in diameter, 5 between 1\(\frac{1}{2}\) and 2\(\frac{1}{2}\) inches, and 1 above 2\(\frac{1}{2}\) inches. As a result of this initial heavy pruning, yield of sound nuts was reduced by 320 lbs./acre over the nonpruned plots. Although nut quality was improved by this pruning, the increase in value was not enough to affect the reduced yield and resulted in a loss of $27/acre as compared to nonpruning.

In 1979, 67 cuts/tree were taken on the selective annually pruned trees, 66 less than 1\(\frac{1}{2}\) inches in diameter and 1 between 1\(\frac{1}{2}\) and 2\(\frac{1}{2}\) inches in diameter. The grower trimming averaged 10 cuts/tree, 9 cuts less than 1\(\frac{1}{2}\) inches in diameter and 1 cut between 1\(\frac{1}{2}\) and 2\(\frac{1}{2}\) inches in diameter. Selective annual and grower-trimmed plots resulted in a reduction of sound yield/acre as compared to the nonpruned plots, 1.34, 1.35 and 1.39 tons/acre respectively. Again, nut quality was improved by pruning. Selective annual pruning resulted in $795, grower trimming $764, and nonpruning $746/acre.

In 1980 the selective annual pruning was directed primarily at the removal of fruit wood since after two years of intense pruning the trees were now opened up with light and fruit wood dispersed throughout the tree. The pruning averaged 33 cuts/tree, 32 less than 1\(\frac{1}{2}\) inches in diameter and 1 greater than 2\(\frac{1}{2}\) inches in diameter. The grower embarked on a program of opening up the tops of his trees, and the grower-trimmed trees averaged 15 cuts/tree, 10 cuts less than 1\(\frac{1}{2}\) inches, 4 between 1\(\frac{1}{2}\) and 2\(\frac{1}{2}\) inches and 1 cut greater than 2\(\frac{1}{2}\) inches in diameter. The total amount of wood removed/tree was greatest in the grower-trimmed trees. Light measurements of selective pruned and nonpruned trees revealed that the pruned trees had a greater amount of light reaching the ground than did the nonpruned tree. Selective pruned trees averaged 74 micro einsteins greater light penetration per reading over nonpruned trees. Spur fruitfulness on the interior two-thirds canopy of pruned trees averaged 48 percent fruitful spurs; nonpruned trees averaged 25 percent fruitful spurs. On the outer third of the tree canopy, pruned trees averaged 55 percent fruitful spurs while nonpruned trees averaged 46 percent fruitful spurs. These measurements reveal that pruned trees had nuts dispersed throughout the tree canopy while the crop on nonpruned trees was concentrated in the outer third of the canopy. Sound yield of selective pruned trees was 2.7 tons/acre; grower trimming, where the heaviest pruning was done, 2.4 tons/acre; and nonpruning 2.6 tons/acre. For the third year in a row, quality factors such as % large, % light meats and % edible were improved in pruned over nonpruned plots. Value/acre was $85 greater in selective pruned plots as compared to nonpruned plots, and $100 greater than the heavy pruned grower-trimmed plots. This trial will be continued for at least one more year.
In 1981 the selective annual pruning was directed again primarily at renewal of fruit wood. The pruning averaged 10 cuts per tree, all less than 1\textsuperscript{1/2} inches in diameter. Grower trimming was skipped this year. For the second year in a row, there was a reduction in yield in the nonpruned plots as compared to the selective annual pruned plots. This year the grower-pruned plots also outyielded the nonpruned plots. The yield data was 2.3 T/A for annual pruning, 2.2 T/A for grower pruning and 2.0 T/A for nonpruned plots. Nut quality value, light penetration or fruitfulness has not been analyzed as yet.

Conclusions: After three years of nonpruning, the crop yield began falling off, and the fourth year the yield reduction was obvious. Heavy pruning in the first two years reduced yield but dramatically increased quality. Lighter pruning the third and fourth year maintained a high yield and slightly increased quality. Alternate year grower-trimming has not yielded quite as well as annual pruning. The heavy pruning increased light penetration and fruitfulness on interior branches but there was not enough increase to compensate for the reduction of exterior fruit wood. Based on this trial, the goal in pruning should be to concentrate on maintaining high production in the outer 1/3 to 1/2 of the tree canopy by renewing fruit wood. The removal of outer branches to allow for light penetration and fruitfulness on interior branches calls for the removal of too much wood and thus reduces total production.