ABSTRACT

Chico walnut trees planted in 1984 in hedgerows (22' x 11'), trained into a fruiting wall and mechanically pruned since 1978 continue to yield significantly greater crop than standard spaced and pruned trees. In 1983, the yields were as follows: hedged two sides 5526 pounds/acre, hedged one side 5545 pounds/acre, unhedged (hedged two sides until 1981 then left unpruned in 1982 and 1983) 6120 pounds/acre, and conventional spaced (22' x 22') hand pruned 3553 pounds/acre. As in previous years, mechanical pruning of the hedgerowed trees was performed with a vertical boom hedging machine positioned to cut about four feet from the trunk and the tree height was maintained at about 25 feet by mechanical topping. Data was collected on nut density and light penetration in the lower portion of the tree canopy in each of the hedgerow treatments to provide a measure of the influence of shade on fruiting potential. Additionally, hand picked nut samples were taken at harvest time from different fruiting positions (interior spurs, exterior spurs and 1-year-old shoots) to determine its influence on nut size and quality. A commercial size (40 acres) hedgerow trial involving Chicos at a 22' x 11' spacing located near Visalia was pruned by hand in its second dormant pruning. The trees will be hand pruned for one more season before mechanical hedging is initiated. A variety trial designed to measure the performance of various walnut cultivars in a high density management system (20' x 10') was established near Visalia in 1982 and grafted in 1983 to 15 walnut cultivars. The cultivars under test include Chico, Ashley, Serr, Payne, Amigo, Tehama, Vina, 67-13, 67-11, 68-104, Hartley, Howard, Sunland, Pedro and Chandler.

OBJECTIVE

To develop more efficient high density management systems for early production and sustained high yield of walnuts, examine pruning systems and how they influence tree physiology and productivity, and determine adaptability of various walnut cultivars and proper tree spacing for hedgerow plantings.

PROCEDURE

The two hedging treatments initiated in 1978 in the Chico trial (1974 planting, 22' x 11') near Vina were maintained in 1983 (one side hedged vs. two sides hedged each year). In addition, yield data was obtained from a third hedging procedure which was initiated in 1982. In this treatment the tree wall is hedged every third year, thus allowing the trees to crop for two consecutive years before they are rehedged.

Nut density data and light measurements were taken at several locations in the lower canopy of the 3 hedgerow treatments in order to get a measure of the influence of shade on fruiting potential. The data was collected on both sides.
of the hedgerow on 2 trees in each plot. The nut counts were made in 4 locations on each side of the tree wall as follows: (1) 0-1 meter above ground and 0-1 meter from trunk, (2) 1-2 meters above ground and 0-1 meter from trunk, (3) 0-1 meter above ground and 1-2 meters from trunk, and (4) 1-2 meters above ground and 1-2 meters from trunk. Interior canopy light measurements (photosynthetically active radiation) were taken by holding a one-meter line sensor horizontally on each side of the tree wall at 1 meter above ground and 1 meter from the trunk of each tree. In addition, hand-picked nut samples were taken at harvest from different fruiting positions to determine its influence on nut size and quality. Samples were taken from interior and exterior spurs and one-year-old shoots. All of this data on nut density, size, and quality will be analyzed in relation to where the nuts are borne within the canopy and the associated light environment.

A new commercial size (40 acres) hedgerow trial involving Chicos at a 22' x 11' spacing located near Visalia has now gone through its second growing season. The training in the first and second dormant pruning has been strictly by hand, and it is anticipated that the trees will again be hand-pruned in the third dormant pruning after which mechanical hedging will be initiated.

Assistance is being provided in the training of a 2.5 acre experimental plot of 22' x 11' spaced Chico trees located at the Kearney Agricultural Center. This test which includes trees under normal density (22' x 22') is being developed under the direction of DeJong and Goldhamer for physiological and cropping efficiency studies related to water use and light utilization.

A variety trial designed to measure the performance of various walnut cultivars in a high density hedgerow management system (20' x 10') was established in 1982 in cooperation with Farm Advisor Steve Sibbett in Visalia. The trees were grafted in 1983 to 15 walnut cultivars in 3 replications with 9 trees in each plot. The cultivars under test include Chico, Ashley, Serr, Payne, Amigo, Tehama, Vina, 67-13, 67-11, 68-104, Hartley, Howard, Sunland, Pedro, and Chandler. A hedgerow variety trial is also being established near Winters in cooperation with Farm Advisor Wilbur Reil. In this trial, black walnut seedlings were planted in 1983 at a 24' x 12' spacing. This block will be grafted over in the spring of 1985 to the cultivars under test in Visalia plus any selections coming out of the breeding program which promise for high density hedgerow planting.

RESULTS AND CONCLUSIONS

The yields obtained from the Vina hedgerow trial in 1983 were as follows: hedged one side -- 5,545 pounds per acre, hedged two sides -- 5,526 pounds per acre, conventional-spaced hand-pruned -- 3,553 pounds per acre. The third hedging treatment started in 1982 in which the trees have now been unhedged for two consecutive years yielded 6,120 pounds per acre. Thus all of the hedgerowed trees are still producing significantly greater crop than the standard spaced and pruned trees. The greater yield of the unpruned hedgerowed trees as compared to those ledged on either one or two sides
follows the same pattern observed last year and suggests that this may be a practical procedure for maximizing nut production. This needs to be evaluated further in relation to nut size and quality before valid conclusions can be made between these treatments. Nut quality data for 1983 is not yet available but all of the data will be analyzed in the coming year and included in next year's annual report.