

Rejuvenation of Neglected, Mature "Wichita" Pecan Trees By Corrective Pruning

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Abstract

An attempt was made in 1997 to rejuvenate neglected, mature 'Wichita' pecan trees in a commercial Pinal County grove by applying two types of heading back pruning cuts. The treatments were applied during the dormant season prior to the growing season. The trees were pruned using proven horticultural techniques which included dehorning (cutting main scaffolds to within 2 feet of the trunk) and cutting main scaffolds by 50%. After four years of data, the trees receiving no pruning treatments are producing as well or better than trees to which the pruning treatments were applied. The data suggests that a return to normal irrigation and fertilization practices alone will return neglected, water-stressed trees to normal productivity as early as trees that have been headed-back.

Introduction

Pecan trees are known to need approximately 60 acre-inches of water each year to maintain productivity and plant health in the desert areas of southern Arizona. Trees receiving less than optimum amounts of water are easily damaged in the harsh environment of the desert.

Reduction in irrigation frequency, irrigation duration and/or water quality can quickly damage highly productive trees in arid climates. Water-stressed trees may show symptoms of shortened internodes; small, sparse leaves; reduction in male and female flowers; and poor fruit retention and nut quality. Severe declines in total production are common. Water stress may be compounded by reduced or improper application of zinc, nitrogen or other cultural inputs.

Fortunately, the pecan tree by nature is resilient due to a diverse and deep root system and will normally remain alive for extended periods of time on reduced irrigation frequencies and rainfall even while suffering severe damage to total production. Because of this, stressed orchards can often be brought back to productivity through careful management.

Producers wanting to quickly return orchards to economic profitability face a number of critical decisions and one of the first is how to stimulate new growth to replace damaged fruiting wood. Heading back pruning is one alternative that is commonly considered. This study investigates and compares the response of water-stressed trees to heading back treatments versus a simple resumption of water and nutrient inputs. The 'Wichita' cultivar, with its characteristic of early production or precocity, is an excellent candidate for rejuvenation.

Procedures

During the dormant period prior to the 1997 growing season, neglected 15 year old 'Wichita' pecan trees were subjected to two pruning treatments for tree rejuvenation purposes. Eighteen trees were selected in a block from a section of an orchard showing severe stress symptoms near Casa Grande, Arizona. Six

trees were left unpruned as an experimental “check”. The remaining twelve trees were subjected to two different pruning techniques. Six were severely headed back to within 2 feet of the trunk. The remaining six were moderately headed back by pruning the main scaffold branches to 50%. All treatments were applied in a completely random design. Yield and nut quality parameters including % splits (pre-germination) were measured as response factors. Results were tabulated and are recorded in Tables 1 and 2.

Results and Discussion

It must be noted that during the first two years of the trial, in 1997 and 1998, water and nutrient stress continued to be part of the production cycle. In 1999, improved management increased water application frequency and duration, applied 200+ pounds of Nitrogen and eliminated weed competition which previously had been a complicating factor. The data seem to show the response of the trees to this change.

The pruning treatments had little effect on measured parameters during the 1997 harvest. Because of the stressed nature of the trees, the heavily pruned and even moderately pruned trees yielded approximately the same as the non-pruned trees. However, those nuts that were harvested showed no real differences in % kernel, a measure of nut quality.

In 1998, while the trees were still under stress, the ½ scaffold treatment outproduced both the heavily pruned and non-pruned trees. The heavily pruned trees yielded slightly more than the non-pruned trees in this year. The increase of production in the pruned trees might be attributed to the increased amount of fruiting wood that developed during the heavy growth of the previous year. There was again no difference in nut quality.

In 1999, the orchard was purchased and placed under a different management plan. Even though the trees were subjected to increased inputs, the total yields in the pruned trees were significantly down as compared with the 1998 season harvest. The non-pruned trees, however showed an increase in yield during this year. These results may be an indication of the resumption of normal alternate bearing tendency or may be an indication of depleted stored energy reserves in the trees brought on by previous stress and moderate fruiting of the previous year. No differences were again seen in nut quality.

In 2000, the non-pruned and ½ scaffold trees each outproduced the severely pruned trees even though total yields were significantly up for all trees over 1999. There was no difference in nut quality.

These data seem to indicate that a simple resumption of irrigation and nutrient applications may do more to rejuvenate the productivity of stressed pecan trees than forced rejuvenation by pruning.

Producers faced with reviving stressed trees may not want to subject already damaged trees to the additional stress of heading back cuts, especially in varieties that are less precocious than the ‘Wichita’ variety.

Additional yield data will be collected during the 2001 season to evaluate the alternative bearing trend seen in the data to date.

Table 1. The effect of two pruning treatments on yield of the ‘Wichita’ cultivar grown in Pinal County, Arizona in 1997, 1998, 1999 and 2000.

Yield (lbs/tree)*					
Treatment	1997	1998	1999	2000	Average 98-00
Control	0.26	15	21 a	30 a	22
½ Scaffold	0.22	27	10 b	27 a	21
Dehorn	0.18	19	9 b	18 b	15

*Numbers followed by similar letters indicate no significant difference statistically when compared with other results.

Table 2. The effect of two pruning treatments on nut quality of the ‘Wichita’ cultivar grown in Pinal County, Arizona in 1997, 1998, 1999 and 2000.

% Kernel*				
Treatment	1997	1998	1999	2000
Control	55	55	57a	55a
½ Scaffold	56	56	56a	55a
Dehorn	60	56	55a	55a

*Numbers followed by similar letters indicate no significant difference statistically when compared with other results.