

Mechanical Hedging of Pecan Trees

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Inadequate sunlight is a major limiting factor to pecan production, leading to an increase in alternate bearing as well as pest and disease problems, and reduction in crop yield and quality. This is particularly so, in the Southeastern United States where frequent cloud cover can limit sunlight during 40-60% of the growing season. As a result pecan growers must manage sunlight in the orchard so that 50-60% of the orchard floor receives sunlight at mid-day. Historically this has been accomplished by removing trees as the orchard begins to crowd. Typically every other tree is removed in every other row on the first thinning at about 15-20 years old, reducing the tree population by $\frac{1}{4}$. Another $\frac{1}{4}$ of the trees are removed in the second thinning several years later.

Hedging is a mechanical form of pruning by which all limbs growing beyond a certain point are removed as you progress down a row of trees. Hedging of pecan trees was developed in Australia and has been increasingly practiced in high-light environments such as New Mexico, Arizona, and West Texas since the 1990's. However, only recently has hedging been utilized as a tool for management of sunlight in the relatively low-light environments of the Southeastern United States. Hedging can provide a method of sunlight management which allows growers to maintain a higher tree population for a longer period of time; however, trees will need to be removed at some point with or without hedging. The timing of that tree removal will depend on the spacing used at planting.

Optimal spacings to consider for hedging when planting an orchard are 35 X 35, 40 X 40, 25 X 50 or 30 X 50. Tighter spacings of 20 X 40, 30 X 30, or 25 X 25 will require both earlier tree removal (likely at less than 10 years) and the confining of trees to smaller height and width. If you are uncertain of your ability or willingness to hedge the trees when the time arrives, choose the wider spacings in the first sentence of this paragraph because they can also be managed reasonably with tree removal. Also bear in mind that the tighter your row spacing, the more money you will spend on herbicide and fertilizer since your tree rows take up a larger percentage of the orchard.

When tree crowding is an issue, hedging in any direction will bring about an improvement in crop production; however, for optimal yields, hedging should be done in a North-South direction so that the trees receive maximum sunlight throughout the day. The pattern of hedging may vary; however, hedging should be done on a 4 or 5 year cycle. The two most common hedging patterns are by mechanically hedging alternate middles or hedging every 4th row in the orchard.

Alternate middle hedging involves mechanically hedging trees along every other row middle in one year, removing growth along one side of the trees in each row in the row middle. Growers can then hedge along the remaining middle the following year, hedge nothing in year 3, and begin on the original row middles again in year 4.

Hedging every 4th row would mechanically hedge both sides of every tree in every 4th row, In this scenario, hedging would need to be employed annually, requiring 4 years to get the entire orchard into

a hedging program. This may lead to larger cuts being made by the time you return to the original rows in the 5th year. Another option is to hedge prune every other row in every other year.

Depending upon tree size and row spacing, the line of hedging should run 7' to 12' away from the trunk as the hedging machine moves down the tree row, leaving adequate space between tree canopies for re-growth. Trees should be "gabled" or topped at approximately a 45 degree angle at a height equal to the distance between tree rows. For example, if tree rows are spaced 30 feet apart, they should be topped at 30 feet.

Ideally, trees should begin a hedging program before they get crowded. Large, old mature trees (50-60 years and older) may take longer to respond to hedging due to the large cuts that are made. Such trees can also be hard on equipment, leading to significant down time with repairs to the machine. Trees in the 20 to 40 year range usually respond relatively quickly and would be a more optimal size tree to hedge.

The first hedging cut often leads to prolific, vigorous growth in the humid Southeastern U.S. because our soil moisture can be adequate to stimulate this growth periodically throughout the season from the larger cuts that are made. Subsequent cuts on smaller wood usually results in less vigorous growth than the initial cut; however, canopies will often grow back together much quicker than growers anticipate.

Preliminary studies have shown no real yield advantage to hedging vs. tree removal alone. Yields from both methods of sunlight management are very similar. However, these same preliminary studies do show potential benefits of reduced water stress, larger nut size, and higher percent kernel, resulting in better quality for hedged trees. Hedging also provides an advantage for disease management on scab susceptible cultivars like 'Desirable'. Adequate coverage from air-blast sprayers only reaches to approximately 40' into the tree canopy. Since a large percentage of the pecan crop is in the upper portion of the tree on a mature tree, it can be difficult to get adequate spray coverage on mature pecan trees. Hedging keeps trees at a smaller size, which allows for a higher percentage of fungicide coverage in the tree canopy.

Hedging also provides a form of fruit thinning that many pecan growers find more palatable than mechanical fruit thinning with a shaker. As one-year old fruiting wood is removed with hedging, the potential crop size for that year is mediated, but not eliminated, and the nuts that develop from the remaining fruiting wood are larger and better filled, leading to less crop stress and more consistent production from year to year, just as mechanical shaker thinning does.

While hedging can be a beneficial practice for pecan production, it is also an expensive and intensive form of orchard management. Thus, it is not a practice that will be conducive to every pecan operation. The cost of a hedging machine is approximately \$300,000, which would likely be cost-prohibitive for pecan operations with less than 500-1000 acres of pecans. In addition, custom hedging costs approximately \$200-\$250 per acre and there currently are not enough custom hedging operations in place to service the pecan acreage in Georgia for those growers who do not own their own hedging machines. In order to be successful, hedging is a practice that requires commitment from growers and

must be done at least 2 out of 3 or 3 out of 4 years once the hedging program is put into place. With the exception of managing tree size, all of the goals obtained by mechanical hedging can also be accomplished with the old method of tree removal to provide adequate sunlight and mechanical fruit thinning to relieve crop stress. Thus, until an adequate number of custom hedging operations are in place to service the Southeastern pecan industry, smaller growers should continue tree removal and fruit thinning as opposed to hedging purely from the standpoint of the economies of scale.