

## *Mowing to Establish Pine Straw Production by Minimizing Competition in Loblolly, Longleaf and Slash Pine Stands after the Establishment Phase*

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### **BACKGROUND**

Pine straw, the uppermost forest floor layer of undecayed needles, is raked, baled (Photo 1), and sold as landscaping mulch in the southeastern U.S., and has become a valuable forest commodity. Annual pine straw income to forest landowners in Georgia has ranged from \$15.5 million in 1999 to \$81 million in 2007 – 2009 and in 2012 was estimated to be \$60 million. Income from pine straw amounts to one dollar (average of \$72.3 million/year) for every six dollars of wood income (average of \$469.6 million/year) in Georgia annually in 2008 through 2012. Pine straw can be sold by the bale or by the acre. Current average per acre reported prices in the southeastern U.S. range from \$50 to \$200 or more per acre for each raking. Pine straw can also be sold by the bale. Per bale prices range from \$0.3 per bale for loblolly, \$0.65 per bale for slash, and \$0.90 per bale for longleaf paid to the forest landowner. A number of factors affect pine straw production rates. They are: species, site productivity, stand density and age, percent of rakeable stand, raking intensity (semi-annual, annual, or periodic) and interval between rakes, competition control, and the use of fertilizers. Longleaf pine is the favored species to rake, followed by slash then loblolly in Georgia, South Carolina and North Carolina. Loblolly will tend to produce approximately 20 to 25% more pine straw than slash and longleaf on most sites.

Pine stands that are weed free are more attractive to pine straw contractors so the use of herbicides, mowing and prescribe fire are important tools to get these pine stands attractive and ready to rake. This paper will address mowing to prepare loblolly, longleaf, and slash pine stands to establish access, control unwanted vegetation by lowering competition heights in the post establishment phase to first thinning stage.

### **MOWING TO PREPARE LOBLOLLY, LONGLEAF, and SLASH PINE STANDS FOR PINE STRAW RAKING**

Mowing young loblolly, longleaf and slash pine stands can be an important part of preparing a stand for eventual raking. While mowing can occur as early as in the second year between the rows (Photo 2 and 3) and can be done any time of the year, the best time of year may be from mid-May to early February. Mowing is not recommended from mid-March to early May for ground nesting birds that may use parts of the pine stand. Mowing consists of a tractor and bush hog (Photo 4 and 5) or other similar equipment.

Choose a bush hog that will match up to the tractor used (horsepower and bush hog gearbox requirements) and a bush hog and tractor width that will get that up and down the rows at their narrowest points. Typically 10 feet rows (at their narrowest being 8-9 feet) need a tractor and

bush hog width no greater than 5 feet. Rows that are 11 to 12 feet wide (10 feet wide at narrow points) may be able to use tractors and bush hogs that are 6 or 7 feet wide. The bush hog should be as wide as the tractor outer wheel to wheel width or slightly (3-6 inches) wider than the tractor. Minimum tractor horsepower (HP) requirements, for conditions that are not overly filled with large woody competition in the rows is around 25 to 30 HP.

## **RULES OF THUMB FOR MOWING**

The first mowing is usually the most important mowing and in some cases may be the only mowing needed (herbicides are then applied prior to the first rake to further clean up the stand). DO NOT let woody unwanted vegetation between the rows get greater than 1 ½ to 2 inches in groundline diameter and taller than 6 feet (Photo 6). Smaller, less powerful HP tractors can be used if woody vegetation is mowed prior to these diameters and heights. Sitting on a smaller tractor (i.e. a 30 HP tractor) the driver's head is about 6 to 7 feet above groundline (Photo 7). The driver can make better time when he or she can see over the in the row vegetation about to be mowed down and can also see trouble spots and drive accordingly. A front end loader (Photo 8) is helpful in mowing as it can be used to push down excessive woody vegetation and can be used to reduce and soil mounding that may have occurred in the prior stand harvest and/or V-blade machine planting operation.

Tractor speed should be slow the first mowing as on many cut-over sites (previous crop was trees) there may be mounds of debris or soil from the harvest and planting (V-blade machine planting) operation that could be hazardous. Set the tractor to bush hog PTO (power take off) RPMs (revolutions per minute) at the factory recommended setting and the tractor RPMs to the proper setting for bush hogging.

## **FORMER OLD-FIELD, HAY FIELD, PASTURE SITES versus CUT-OVER SITES**

Old-field sites (previous crops were corn, soybeans, peanuts, cotton and a winter grain rotation), hay cutting grass fields, and former pastures are usually woody vegetation weed free and do not need mowing. These sites may have some herbaceous (grasses and broadleaf weeds) vegetation and vines that usually just require burning and herbicides to get ready for raking prior to the first thinning.

Cut-over sites (previous crop was trees, in some cases for 2, 3 or more rotations) are sites that will almost always need mowing between the rows prior to pine straw raking (with herbicides and burning also used after mowing) to provide stand access and reduce row competition to manageable heights. Mowing alone will not kill most hardwoods, grasses, broadleaf weeds, vines or shrubs but will kill most volunteer pines if cut low enough to the ground (6 to 8 inches or less). Cut-over sites that have had moderate (chemical + burn) to intensive (mechanical+ chemical + burn) site prep and V-blade machine planted are best suited to be prepped for pine straw raking (Photo 9). Machine planted rows tend to be straighter than hand planted rows which can be important when preparing a site for pine straw raking as well as the pine straw raking activity itself (Photo 10).

## SUMMARY

Mowing along with proper pre-plant site prep, planting straight rows with consistent row widths from row end to row end, burning and proper and timely herbicide application(s) are activities usually needed to get most cut-over sites ready for pine straw harvesting. Mowing should be done with the proper matched equipment (tractor and mower) with HP, PTO RPMs, tractor RPMs, and tractor and bush hog width to match the site, row width and conditions. Mowing should occur prior to unwanted vegetation being greater than 1 ½ to 2 inches in diameter and 6 feet tall. Many cut-over site stands will need a first mow at planted pine age 2- or 3-years old.



Photo 1. Pine straw being hand raked into piles and manually baled in an unthinned loblolly pine stand in Twiggs County, Georgia.





Photo 2 and 3. Mowing between the rows of 2-year-old slash pine (row spacing is mostly 12 feet) done November 2015 in Emanuel County, Georgia. Note the volunteer pines in the foreground of the photo on the right having been mowed down. If volunteer pines are cut lower enough to the ground (6-8 inches or less) they are usually killed.



Photo 4 and 5. Mowing equipment usually consists of a tractor and bush hog with enough tractor power (25 to 30 horsepower is a reasonable minimum) and bush hog strong enough to do the particular job.



Photos 6 and 7. Note cut vegetation in the photo on the left is small in diameter (less than 1 ½ inches) and was less than 6 feet tall prior to mowing. In row unwanted vegetation should be less than 6 to 7 feet tall for the best visibility (right photo).





Photo 8. A front end loader (load capacity of 650 lbs) on the front of a compact tractor. The front end loader can be useful for pushing debris out of the row, pushing down excessive woody vegetation (aiding in the bush hogging and visibility), and grade mounded soil to be safer, more even terrain to mow on.



Photo 9 and 10. A cut-over site (previous crop was 21 year old loblolly with 500 to 1000+ hardwoods per acre) that was chemically treated in early August 2010, burned early November 2010 and V-blade machine planted in late December 2010 @ 6 x 10 feet spacing with high genetic quality slash seedlings in Laurens County, Georgia. Prep plant site prep to eradicate the majority of woody and herbaceous vegetation and volunteer pines (the burn helps with reducing volunteer pine numbers and cleans up site greatly for planting) and machine planting creating straight more consistent row widths is important for a site to be prepped for pine straw raking.

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## **CITATION**

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