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Growth and Yield of Loblolly, Longleaf, and Slash Pine Stands on Old-field and Cut-over Sites in Florida, Georgia, and South Carolina

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Loblolly, longleaf, and slash pine growth and yields on old-field sites are often greater than those found for these important southern pines growing on cut-over sites under low to moderate levels of forest management when compared on the same soil series. Yet, intensive forest management of loblolly and slash pine on cut-over sites can produce greater wood production when compared to old-field sites under modest levels of management on the same soil series. There are a number of factors for these growth differences. Listed below are the major influencing factors on growth for old-field and cut-over sites.

Old-field sites are sites whose previous crop was a rotation of annual crops such as corn, soybeans, cotton, peanuts, and a winter grain (oats, wheat or rye) with a history of fertilization, liming, disking, and herbicide use or pasture and hay field sites that have also had a history of fertilization. Table 1 lists loblolly, longleaf, and slash pine growth and yield on old-field sites under modest levels of management.

The following old-field characteristics enhance growth:

- a large nutrient reserve from a long history of fertilization; sufficient for enhanced pine growth for the first 15- to 20-years or more based on 12 studies in Georgia
- good soil tilth (on the annual cropping sites) providing for excellent root development where a history of subsoiling has been performed
- no or negligible hardwood or woody shrub competition for the first 10- to 15-years

Cut-over sites are sites whose previous crop was trees. Some sites may have had trees (pine, mixed pine hardwood or hardwood stands) on the land for one, two, or three or more rotations, dating back to the early 1950's, 1930's or before.

The following cut-over site characteristics curtail optimal growth:

- a low nutrient reserve from not having been fertilized on a regular basis since the last time the land was in crop or grass production

•reduced soil tilth from no disking, chisel plowing or subsoiling which reduces surface soil root growth in some cases (poorly drained soils where bedding is needed, eroded, clayey textured soils, or on soils with frequent harvesting traffic causing compaction and rutting)

•in many cases a hardwood and/or shrub component is present (unless eradicated with chemical and/or mechanical means) that reduces pine growth

Growth rates achieved on any given parcel of land will vary somewhat on cut-over sites and old-field sites due to the following factors: •soils, •site preparation intensity, •planting timing and seedling quality, •level of seedling genetic improvement or clone used, •seedling spacing and survival, •insect and/or disease control, •timing and number of herbicide treatments and fertilizer treatments (more so on cut-over sites), •timing and intensity of thinning harvests, •rotation age and other factors.

Recent research by UGA Warnell School faculty and other universities have shown that under intensive levels of management, loblolly and slash pine growth on cut-over sites can rival and surpass growth rates found on old-field sites (Table 2) when the aforementioned cut-over site growth limiting factors are ameliorated. Loblolly pine (*Pinus taeda*) tends to outperform slash pine (*Pinus elliottii* var. *elliottii)* by about 15 percent and outperforms longleaf pine (*Pinus palustris)* by 20 percent on most soils. Longleaf and slash pine do not respond as dramatically to cultural practices as loblolly pine and have a more limited range in Georgia.

Table 1. Mean Annual Increment (MAI) yield estimates for loblolly, longleaf, and slash pine on old field sites (as stemwood+bark green weight)

Pine species	Ages (years)	County, State	Mean annual increment (tons/ac/yr)
loblolly	11	Clarendon, SC	7.5
	12	Clarendon, SC	7.3
	15	Washington, GA	6.7
longleaf	21	Tift, GA	6.4
	21	Screven, GA	6.8
slash	12	Toombs, GA	7.5
	12	Brantley, GA	7.8
	12	Dodge, GA	6.0
	17	Dodge, GA	5.7
	20	Mitchell, GA	5.1

Table 2. Mean Annual Increment (MAI) yield estimates for loblolly and slash pine using moderate to intensive management on cut-over sites sites (as stemwood+bark green weight)

Pine species	Ages (years)	State	Mean annual increment (tons/ac/yr)
loblolly	4	Georgia	5.3
	6	Georgia	3.6
	7	Georgia	7.8
	8	Georgia	8.4 to 9.5
	9	Georgia	10.5 to 12.7
	12	Georgia	7.8 to 10
	12	Georgia	7.0 to 9.75
	15	Georgia	7.9
slash	10	Georgia	5.6 to 7.0
	12	Georgia	5.8 to 7.5
	20	Florida	6.5

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