

BENEFITS OF LOBLOLLY PINE GENETIC IMPROVEMENT FOR THE UPPER COASTAL PLAIN OF MISSISSIPPI

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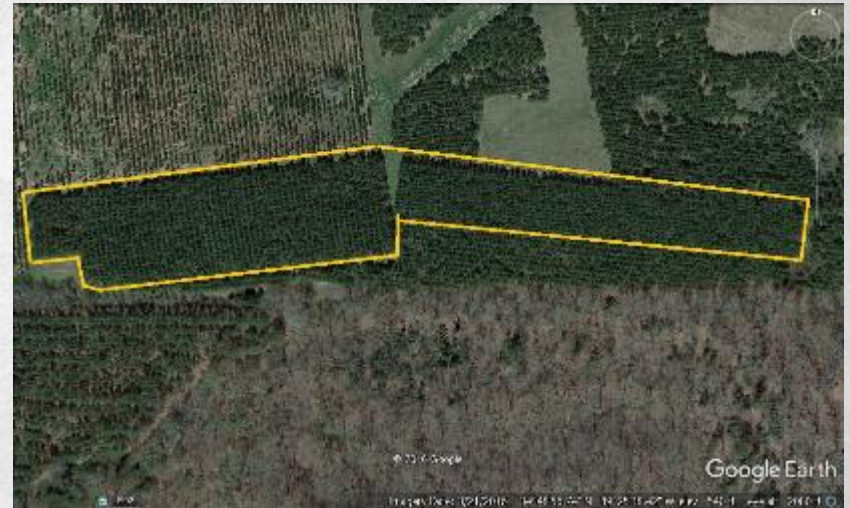
Background

- Loblolly pine (*Pinus taeda* L.) is the most cultivated pine species in the southern U.S.
- Breeding programs have made great strides in genetic gains.
- Currently, there more choices of genetic stock than ever before.
- In many cases, the forestry tools utilized by the private non-industrial landowner (NIPL) and their industrial counterparts are often very different.



Holly Springs Study

- Established in 2007 in north-west Mississippi.
- Three treatment plots with six replications.
- Planting stock treatments
 - Single OP 2nd-Gen. Family
 - MCP
 - Mixed Varietal Material



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Holly Springs Study



- Pre-plant
 - Subsoiled to 14 inches
 - 64 oz./ac Glyphosate
- At planting
 - 20mg Imidacloprid tablet
- Post-plant
 - 6 oz./ac Hexazinone + Sulfometuron Methyl
 - 1.4 oz./tree Fipronil



Holly Springs Study

Planting Stock

- Bare-root Second Generation half-sib OP Family (MWV356)
- Bare-root MCP (M0023)
- Containerized Varietal material (56 SE clonal lines)



Specific Objectives

- Compare growth performance of the different genetic improvement levels of loblolly pine.
- Compare the product classification divergence at age 9 for each planting stock type.
- Estimate current market value of standing timber by stock type and product classification.
- Determine revenue gains/losses among genetic materials tested under normal intensity management similar to NIPL.



Measurements

- Annual Measurements (2008 to present)
 - Total Height (feet and tenths)
 - DBH (inches)
- 2017 Evaluation of Form Classification



Methods

Volume to ton conversions for various pine products in Mississippi.

Pine Product ¹	Average DBH ²	Tons per Unit Volume Conversion ³
Hogfuel	various	2.6 tons per cord
Pulpwood	various	2.6 tons per cord
Chip-n-Saw	various	2.6 tons per cord
Sawtimber	10	14 tons per MBF
	12	9.8 tons per MBF
	14	8.5 tons per MBF

¹Pulpwood is a timber product that yields chips only. Chip-n-saw is a timber product that yields two-by-fours and chips. Sawtimber is a log large enough to saw into lumber, usually at least 16 feet in length.

²Average DBH = average diameter at breast height in inches.

³1 ton = 2,000 pounds; 1 cord = 128 cubic feet stacked wood; 1 MBF = 1,000 board feet, Doyle Log Scale. (Dicke and Parker 2016)



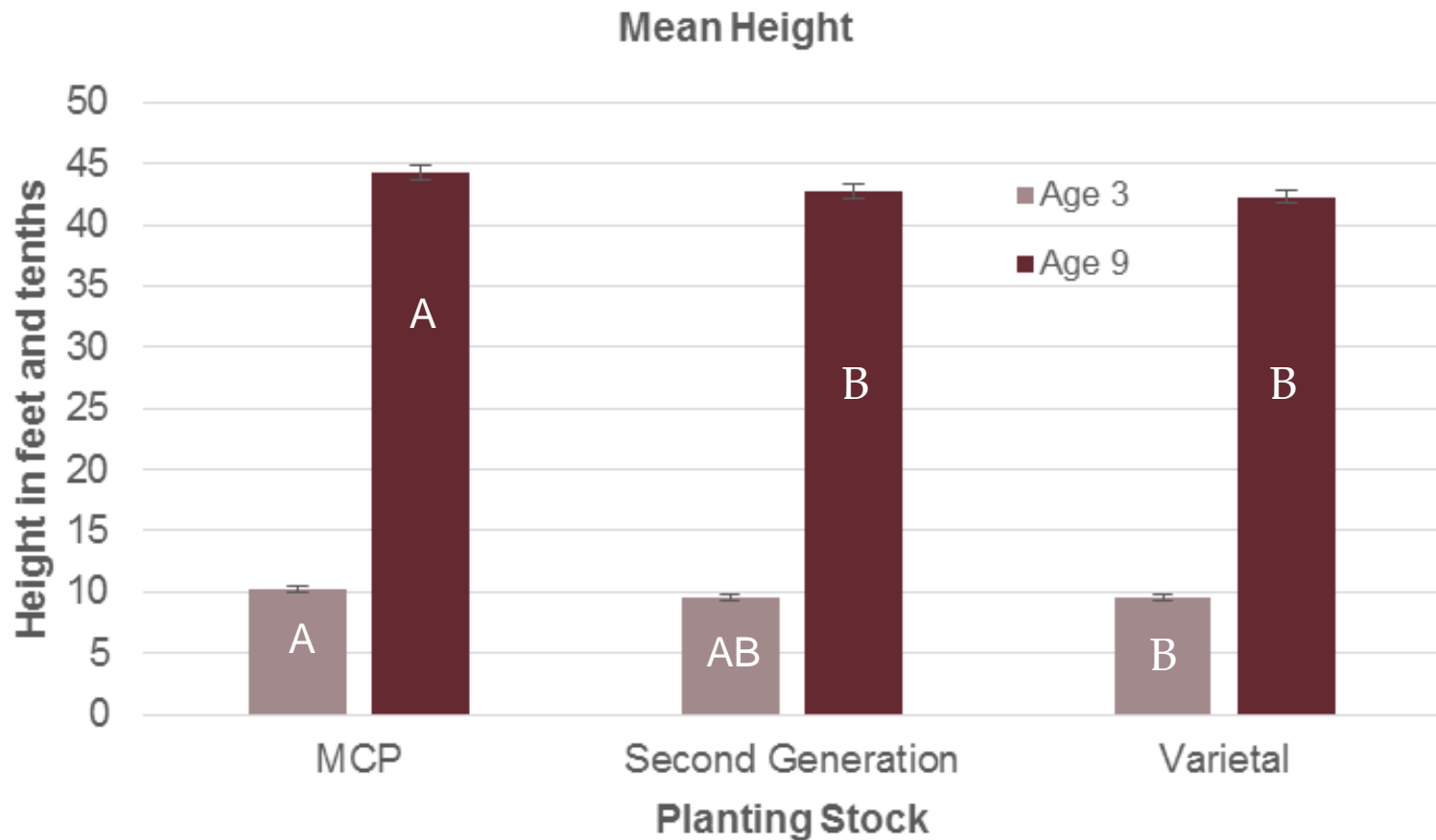
Analysis

Mixed Model Analysis (SAS 2014)

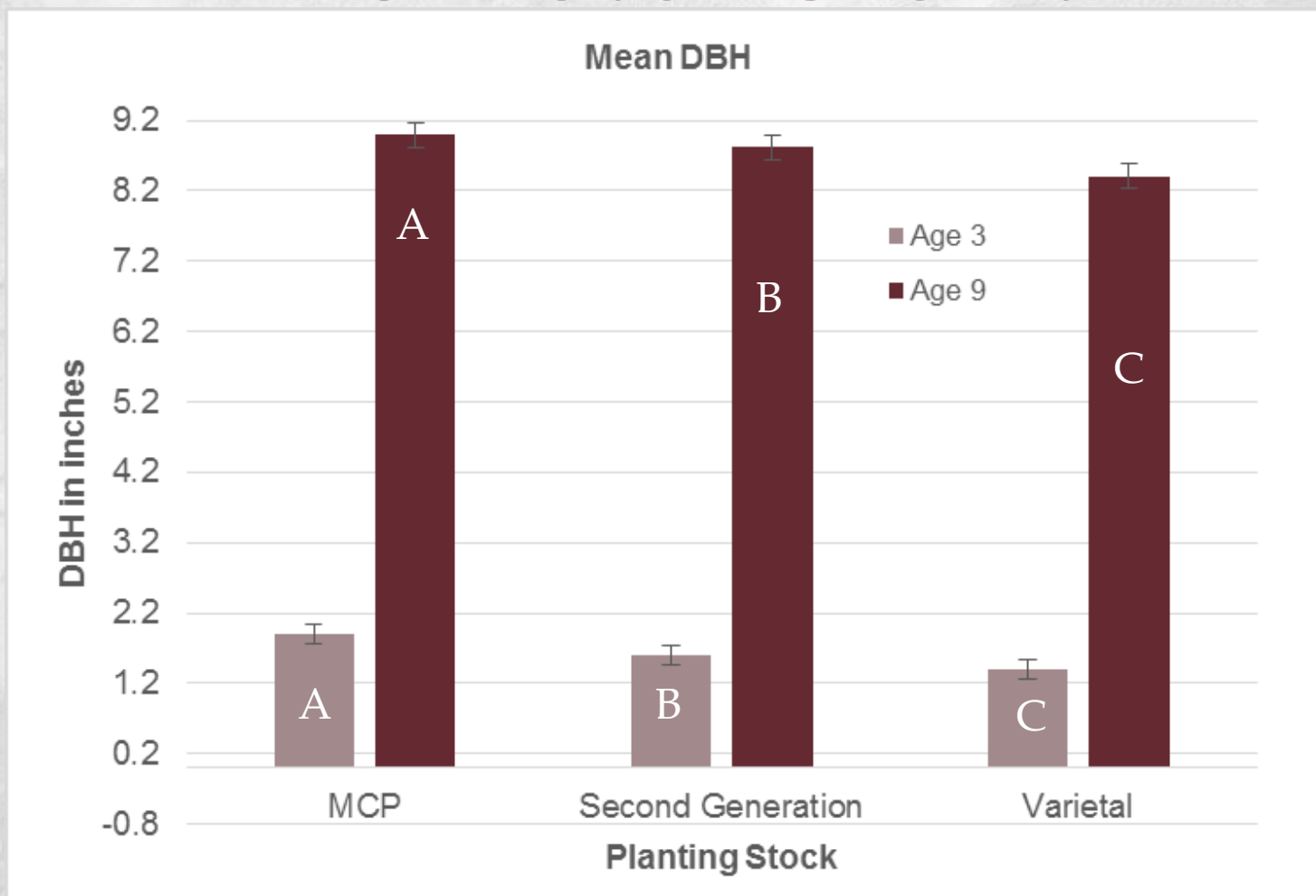
- PROC MIXED
 - Tree growth parameters
- PROC GLIMMIX
 - Tree classification comparisons



Height Growth

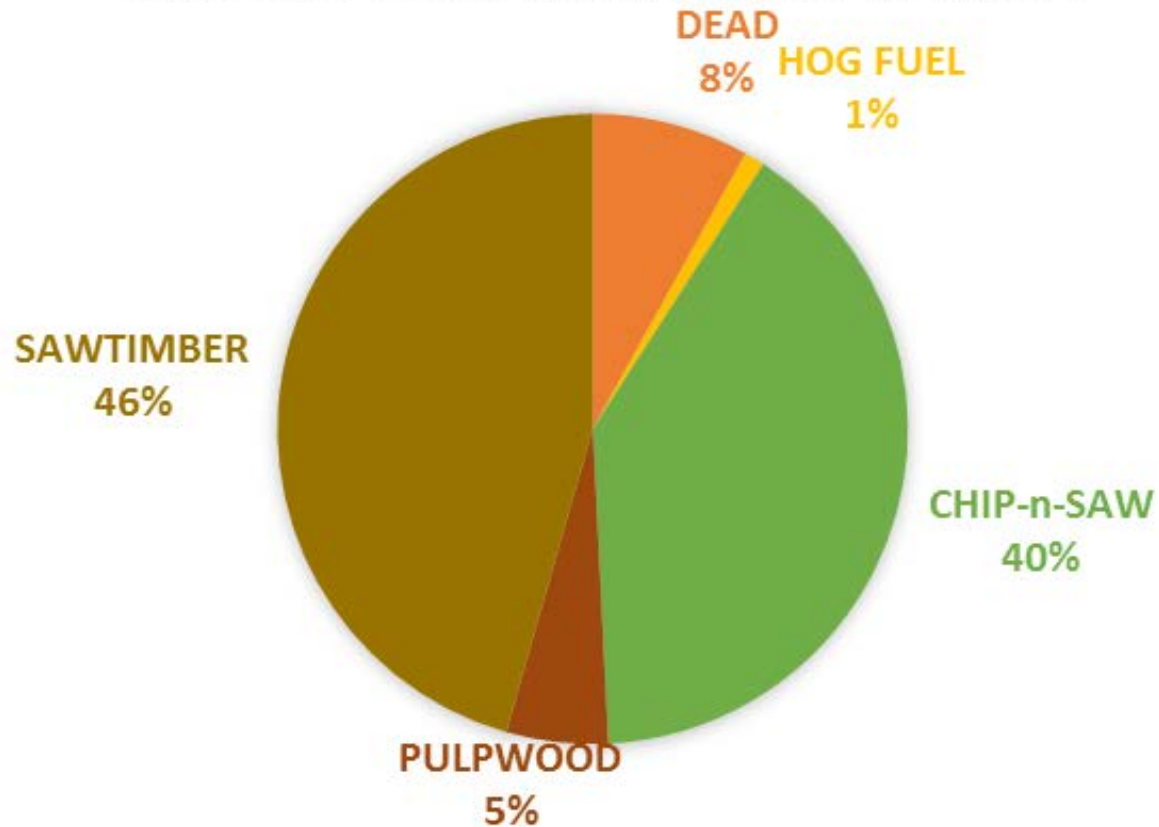


Diameter Growth



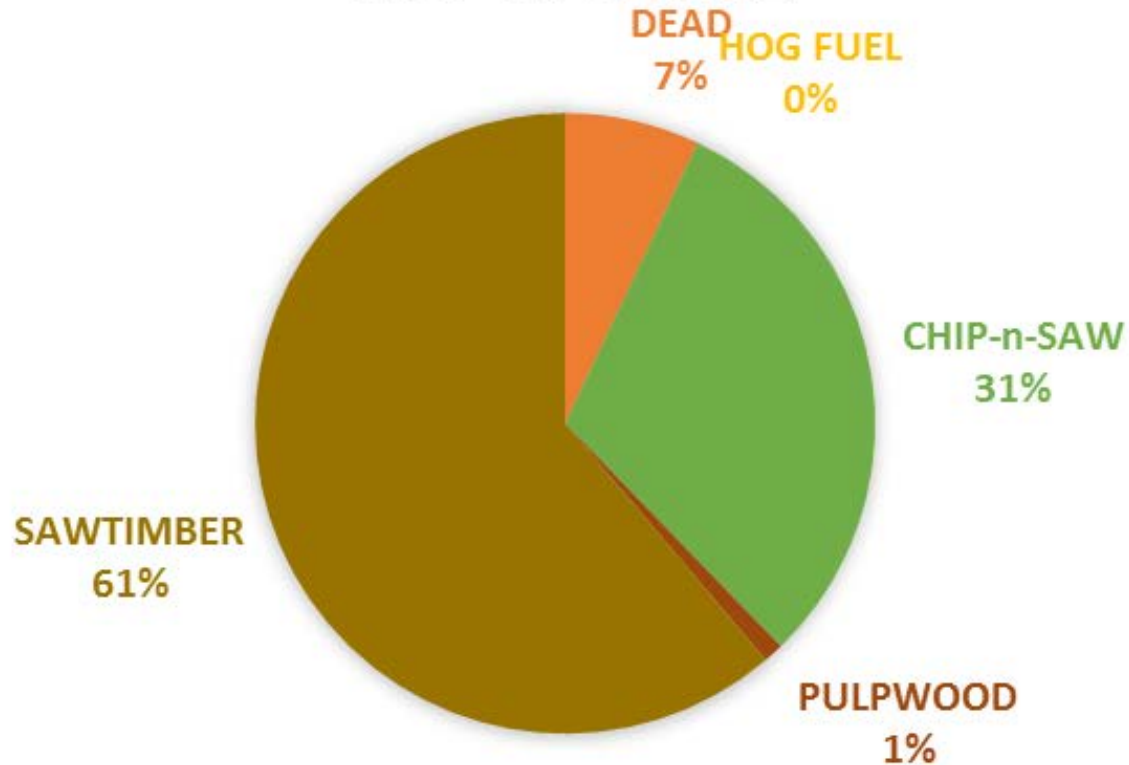
Lumber Grade

SECOND GENERATION MATERIAL



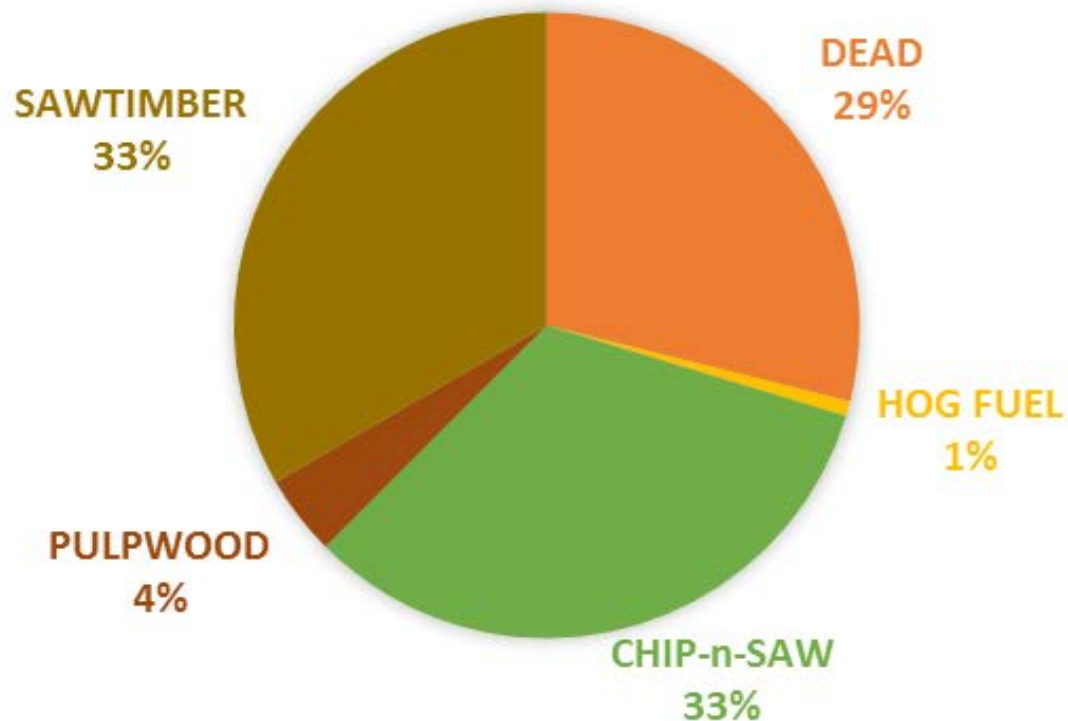
Lumber Grade

MCP MATERIAL

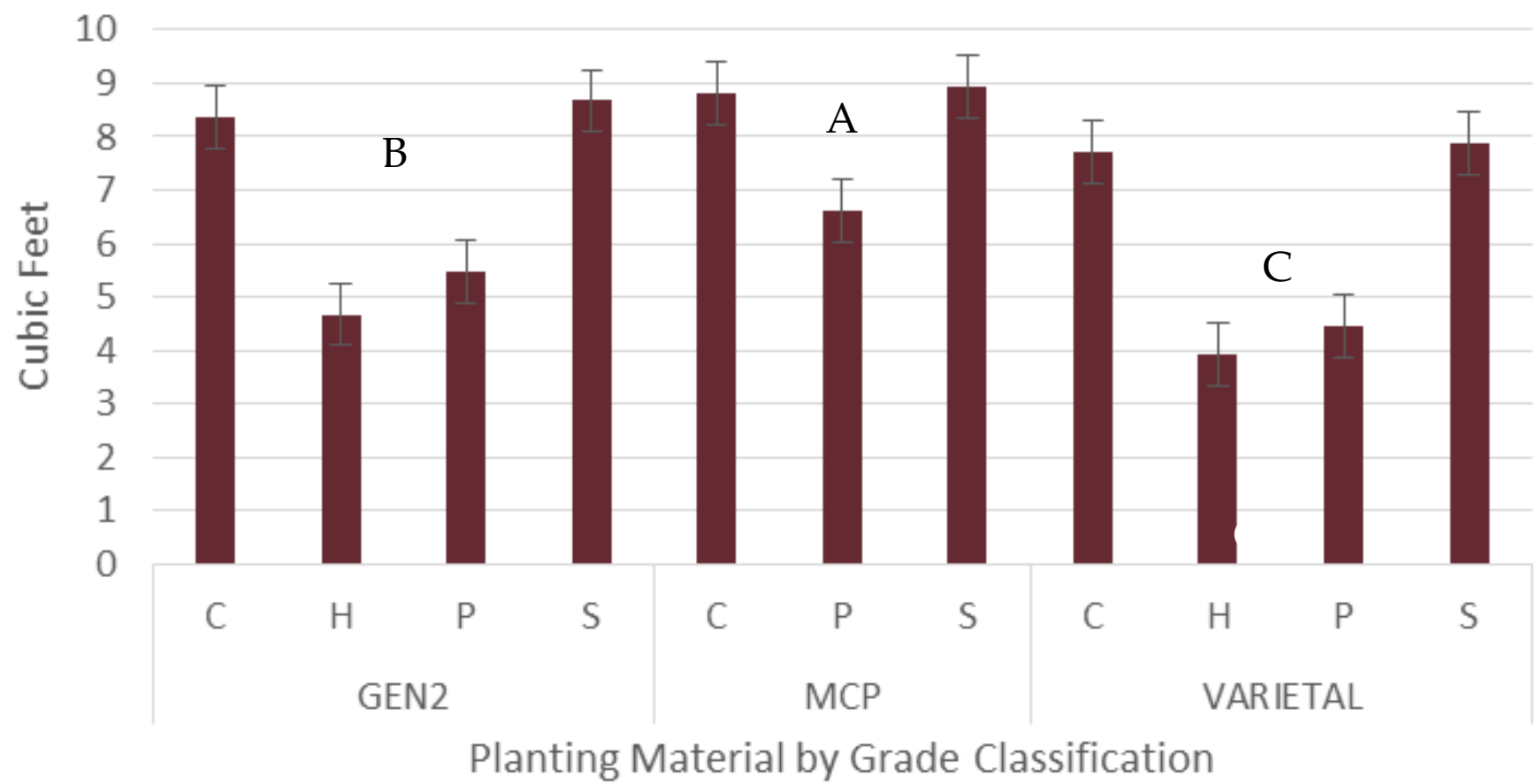


Lumber Grade

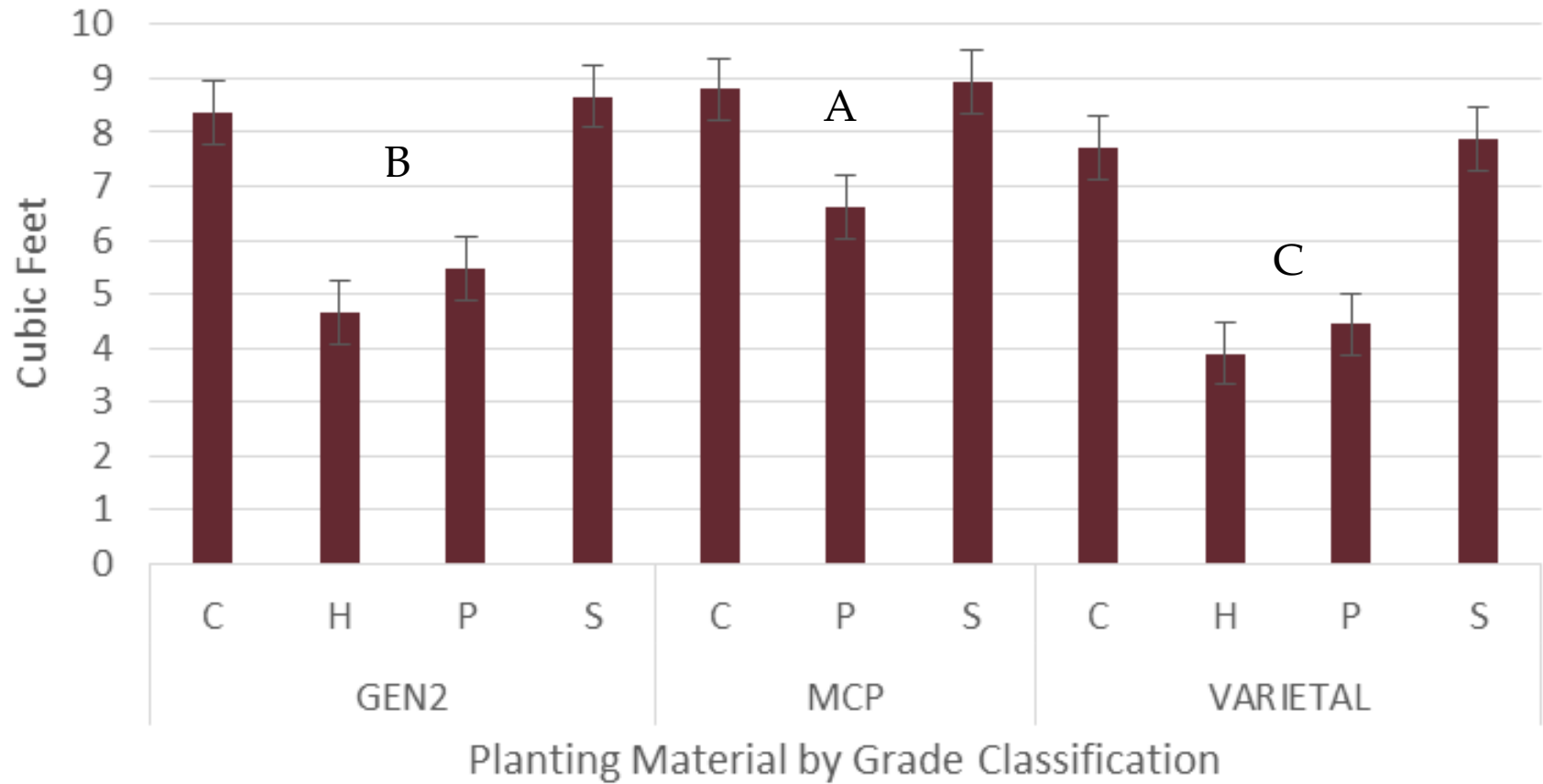
VARIETAL MATERIAL



Mean Total Volume



Mean Merchantable Volume



Current Market Value per Acre

Product Grade	Second Generation	MCP	Varietal
Sawtimber	\$534.53b	\$550.57a	\$485.47c
Chip-n-Saw	\$336.29b	\$354.11a	\$310.14c
Pulpwood	\$220.13a	\$124.08b	\$10.10c
Hogfuel	-\$187.44a	-	-\$157.08b
Dead Trees	-\$4.22b	-\$6.14b	-\$54.11a
TOTAL	\$899.29b	\$1022.62a	\$594.52c

June 1, 2017 Timber-Mart South and Mississippi Market Bulletin Prices for 1st Quarter 2017 Stumpage Prices per Ton. NOTE: Prices vary across the state and may not reflect local market: Pine Sawtimber \$23.00, Pine Chip-n-Saw \$15.00, and Pine Pulpwood \$7.00. Value loss for Hogfuel calculated based on pulpwood values. Value loss for dead trees reflect stock material and planting costs per tree only.



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Discussion

- The trend in average diameter growth remains relatively the same.
- The Second Generation and Varietal materials continue to have less height growth than the MCP materials at age 9.
- MCP materials have the greatest volume growth at this site.



Discussion



- The Varietal material plots sustained the highest mortality of all plots which may be related to site specific issues.
- The MCP plots were dominated by the two highest value product categories.
- Second generation plots performed better than the varietal plots.



Discussion

- MCP planting stock has higher current stand value than either Second generation or Varietal materials on a per acre basis.
- Varietal materials had the lowest estimated stand value at present.



Discussion

- The average NIPL in MS owns approximately 50 acres of timberland (Londo 2004)
- At 400 TPA, reforestation utilizes 20,000 seedlings
- Breakdown of seedling to tree costs only

Monetary Values	Second Gen OP	MCP	Varietal
Seedling Cost	\$1,100.00	\$2,840.00	\$8,000.00
Current Value/ac	\$899.29	\$1022.62	\$594.52
Total Value	\$44,964.50	\$51,131.00	\$29,726.00
Overall Total	\$43,864.50	\$48,291.00	\$21,726.00



Conclusions

- MCP materials have the best growth performance and graded into the highest product categories overall.
- Varietal materials experienced high mortality at this site possibly related to sensitivity to ice damage and droughty conditions.



Conclusions

- The limited varietal material included in the test does not provide a good evaluation of varietal types.
- The inclusion of better suited varietal material could alter the results more in the favor of varietal type
- Based on landowner objectives and the data from this study at this time we recommend the planting of MCP or second generation OP materials over varietal materials for NIPL in the upper coastal plain of Mississippi.



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