

Associations between Southern Pine Decline and Wood Quality

Loblolly pine (*Pinus taeda*) is among the most important tree species in the world in terms of wood utilization (McKeand et al. 2003). This pine species is widely planted in the southeastern United States, and the corresponding plantations are highly productive areas with management for production specifically targeted to address increased population growth (Fox et al. 2004). Recently, southern pine decline (SPD) has been identified as a potential factor in specific stands in the South where loblolly pine productivity is reduced or stands exhibit high levels of mortality. Unlike other forest health issues affecting loblolly pine, whereby a clear abiotic or biotic factor is identified (e.g., bark beetles), this phenomenon appears to be a combination of biotic and abiotic factors. To date, no study has examined the wood quality of the trees, and thus this project will investigate the relationship between external symptoms of trees with the quality of produced wood.

Background

Sites where loblolly pines are symptomatic for SPD tend to have sparse crowns, heavy cone crops, and short/yellow needles, with mortality more random than that observed by primary insect and disease species (Coyle et al. 2015). SPD has been mostly identified with stands along the fall line between the Piedmont and Coastal Plain in Alabama and Georgia. Within this area, the forest industry has suggested that symptomatic stands have differing weight scaling factors than asymptomatic stands, and thus it appears that green moisture content is altered. It remains to be determined if trees from symptomatic stands have different wood density allocations that would negatively affect the overall quality of wood.



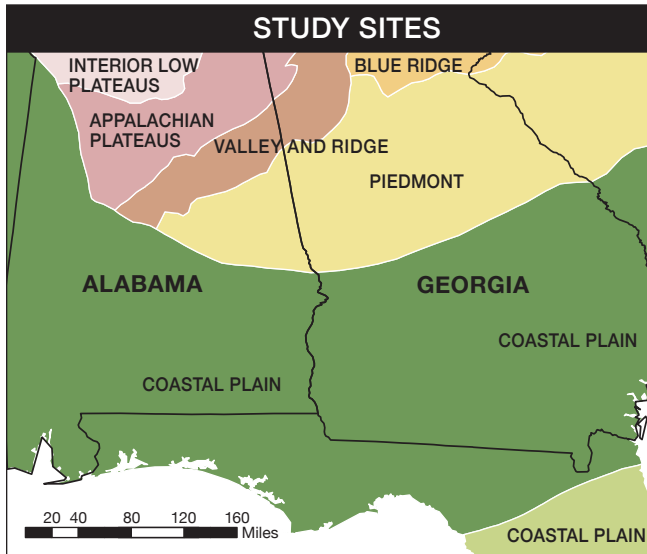
Symptomatic loblolly site having weakened and dead trees.

Objective

The objective of the study is to establish the relationship between pine trees suffering from SPD-like symptoms and wood quality.

Approach

We will identify a total of 14 stands near the Piedmont and Coastal Plain fall line of Alabama and Georgia. Seven asymptomatic stands will be identified and used to collect control samples. Seven symptomatic stands will be identified as having SPD and used to collect test samples. Ten asymptomatic trees will be selected on each stand, and 10 symptomatic trees will be selected on the symptomatic stands. The overall health of each tree will be assigned using a 1–5 scale,



Sampling will occur between the Piedmont and Coastal Plain regions.

where 1 indicates a live tree, 5 a dead tree, and 2–4 indicate gradual thinning of the tree crown. Trees will be inspected for insect and disease activity. Tree roots will be extracted to determine the presence of *Heterobasidion* root disease and/or *Leptographium* spp.

We will collect two 12-mm increment cores from the breast height of each tree. One core will be used to determine the weight scaling factor (overall wood density, bark density, and green moisture content of wood and bark). The second core will be processed and analyzed by X-ray densitometry to determine specific gravity and ring width information from pith to bark. We will analyze the collected data to establish the link between wood quality and forest health for SPD stands and compare the results to the asymptomatic control stands.

Expected Outcomes

The research will establish a link between a forest health issue and wood quality in loblolly pine. The research is of considerable interest to forest landowners in the southeastern United States and the forest industry, given the importance of loblolly pine and the high number of family landowners that manage pine plantations. A comprehensive report summarizing the project will be produced at the end of the project.

Timeline

The project period is from July 2016 to June 2018. Fourteen field sites will be identified during 2016. Fieldwork will take place during 2016 to 2017; wood quality work will follow sampling and will be completed by the end of 2017. Data analyses and project report writing will be completed in 2018.

Cooperators

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