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Mitigating Needle Blight: A Growing Economic Treat to Pine Forests

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/// Project Description:

Pine forests and industrial wood plantations in the southeastern U.S. are crucial for the region's economic sustainability. There has been an increase of reports throughout Alabama and the southeastern U.S. of a suite of needle blight pathogens over the past ten years. Brown spot needle blight is a native disease caused by the fungus *Lecanosticta acicola*. Brown spot fungi complete their life cycles on pine needles. The infection causes needle chlorosis (yellowing) followed by necrosis (death), which results in the premature shedding of needles, reduced growth and, finally, tree mortality. This problem may occur not only on a large regional scale but also on isolated acreages, which is vital as the majority of the seven million acres of pines in Alabama are privately owned. With over half of the counties in Alabama currently affected, it is estimated that a 50% needle blight infection rate in Alabama's susceptible loblolly pine trees could result in economic losses of \$2 billion. An investment in mitigating forest pests, such as those associated with needle blight, requires adaptive management geared to prevention and mediation that provide economically sound solutions. The long term goals of this work are to (1) determine the distribution and movement of the needle pathogens, (2) understand the disease cycle and the environmental factors that drive the emergence and distribution of the needle pathogens, and (3) determine if the appearance is due to more aggressive strains of the pathogen. The knowledge produced by this project will be used to develop best management practices for areas affected by needle blight. It shall also help direct future research actions, especially when little is known regarding the impact of the pests/pathogens associated with loblolly pine in the southeastern U.S.

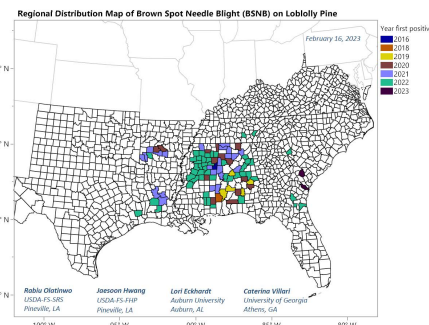
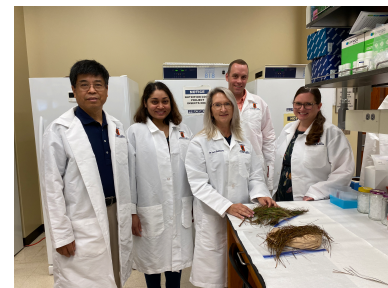
Project Timeline and Outcomes:

This 3-year project aimed at determining the actual impacts on productivity and biological cause(s) of needle blight so that landowners and forest managers can more precisely predict future timber revenues from affected stands and adjust management activities accordingly. Results from the project shall provide:

- A collection of factors to account for losses from brown spot needle blight in productivity models.
- An improved understanding of the interactive effect of fungal infection, stand environment, and tree physiology on loblolly pine sustainability which is required for developing remedial actions and productivity models for trees and stands.
- The acceptable infection levels and those that fall above the damage threshold.
- An understanding of tree-level infection levels.
- An understanding of the genetic variability of the fungus and how it is related to infection level and severity.
- Distribution and movement of the pathogen across the southeast.

Project Impact and Future Objectives:

This work needs to be expanded in scope and area to understand and mitigate brown spot needle blight, safeguarding the region's ecosystems, economy and pine resources. The disease has begun severely impacting loblolly pine forests in Louisiana, Arkansas, Mississippi and other southeastern States. The disease's sudden impact on loblolly pine remains unknown, and its potential to increase susceptibility to other pests, such as southern pine beetle and Ips, could result in secondary outbreaks. The need for immediate research into epidemiology impacts and management is crucial.



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