

Southern Pine Health Project

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The southern yellow pines (loblolly, longleaf, slash, and shortleaf) are the most common pine species in the southeastern U.S., and are some of the most important tree species in the world. Areas of declining and dead southern pines have been reported for decades. Recently several species of root-feeding insects and their associated fungi (*Leptographium* spp. and *Grosmannia* spp.) have been implicated as causal factors in reduced pine health and tree mortality or “Southern Pine Decline”. However, many factors affect pine health in our region. In addition to pests and pathogens, drought, soil type, and management can all have important impacts on southern pine health and growth. Insects and fungi are often found in unhealthy pine stands, but there is currently no evidence that these pests or pathogens cause what is reported as southern pine decline. Proper stand management, including planting the right tree species on the right site, thinning, prescribed burns, and weed control, is the most important factor in maintaining healthy pine stands.

Root-feeding beetles are not attracted to healthy trees

Root-feeding beetles have been implicated as possibly causing or spreading fungi associated with declining pine trees. To address this question, we conducted tests during 2012-2013 in loblolly pine stands in northeastern Georgia.

We tested the attractiveness of beetles to healthy trees, stressed trees (simulated by baiting trees with ethanol and turpentine, two chemicals emitted by stressed pine trees), and dying trees (those girdled with a chainsaw). Beetles were rarely captured near healthy trees, and most often captured near stressed or dying trees (Fig. 1A). We also found feeding damage by root-feeding beetles to be greatest near girdled trees (Fig. 1B). These data indicate that root-feeding beetles are not associated with healthy trees, and are generally found with stressed or dying trees.

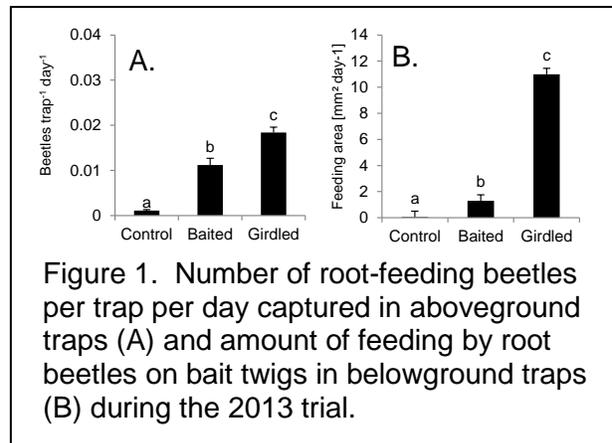


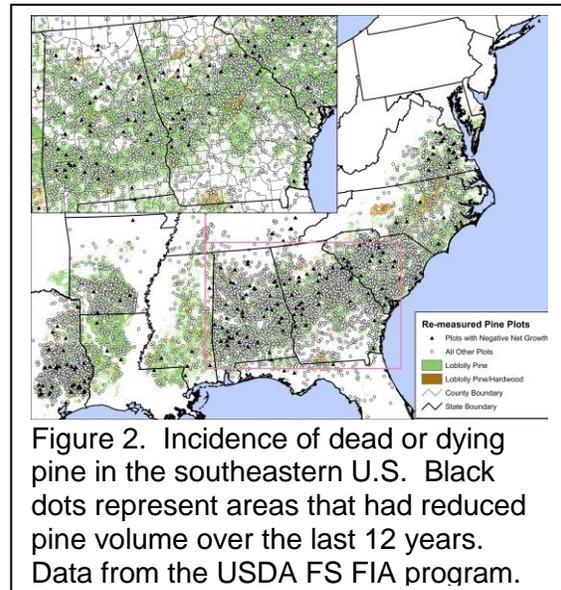
Figure 1. Number of root-feeding beetles per trap per day captured in aboveground traps (A) and amount of feeding by root beetles on bait twigs in belowground traps (B) during the 2013 trial.

Leptographium fungi are present in healthy stands

There are many species of *Leptographium/Grosmannia* fungi, all of which are transmitted by insects. These fungal species in the southeastern U.S. are primarily transmitted by root-feeding beetles. We surveyed 37 stands (with and without declining pine trees) in Alabama and Georgia for insect damage and the presence of *Leptographium/Grosmannia* fungi. Insect damage varied among sites, but these fungal species were present in every stand - both healthy and unhealthy – that we sampled. These data indicate that *Leptographium/Grosmannia* fungi are common across the landscape. Whether individual species are associated with tree decline and death remains to be seen.

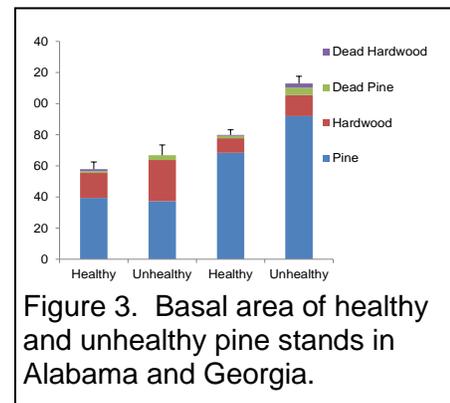
Southern Pine Decline is not a widespread problem

While reports of dying pine trees have been around since the 1950s, there is no evidence that this issue is widespread across the southeastern US. Our analysis of FIA data show no widespread pine growth decline or mortality (Fig. 2). We surveyed 1,280 forest landowners in Florida, Georgia, and South Carolina to ask them about the health of their pine stands and their knowledge of southern pine decline. Most (>70%) had never heard of southern pine decline, and most people reported healthy pine stands with low (<25%) tree mortality. These data indicate that pines in the southeastern U.S. are generally in good health. Further, nearly everyone that responded would be willing to use silvicultural treatments to improve stand health.



Stand management is important

Stand management has important implications for all aspects of southern pine health. We measured attributes of 37 loblolly pine stands in Alabama and Georgia, and found that stands reported to have southern pine decline had a higher ratio of hardwood basal area or a greater total basal area (Fig. 3). Southern pine stands perform better when hardwood competition is controlled, and when overall basal area is maintained at 80-120 ft²/ac. Our data suggest that factors other than basal area (e.g. slope, aspect, soil type) may be influential, and also support existing recommendations to maintain proper stand health and keep basal areas within recommended ranges.



Unanswered questions regarding Southern Pine Decline

- What are the roles of abiotic and biotic factors in influencing pine health?
- Can root-feeding weevils and/or individual *Leptographium/Grosmannia* species – alone or in combination – kill mature pine trees?

Southern Pine Health Website

For up to date information about southern pine health, silviculture and other pine health issues please see www.facebook.com/southernpinehealth or www.sph.uga.edu.