

Forest Health

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Protecting
Protecting our forests is a continuing challenge. Damage to forests can come from wind, water (drought and or prolonged standing water), ice, lightning, fire, invasive species (such as kudzu and Cogongrass), diseases, and insects.

To protect your forest's health, follow these basic prevention guidelines:

- Match your site with the appropriate tree species.
 - Alter stand density.
 - Promptly salvage all lightning-struck, logging-damaged, diseased, or otherwise high-risk trees.
 - Harvest overly mature trees when pest activity is low.
 - Plant trees only in their natural range.
 - Minimize site and stand disturbance.
 - Harvest all mature trees at, or shortly after, rotation age.
- Following these recommendations will promote a healthy forest.

Numerous insects and diseases can be observed in our forests. However, only a few currently cause major problems. We must, however, always be aware that new exotic species may be introduced into our forests and severely impact their health. The agents that are damaging to our pine resources are our greatest concern.

Insects

Pales and Pitch-Eating Weevils

These insects can severely damage recently planted pine seedlings. Under high population levels, young plantations may also be damaged. Adult weevils are attracted to freshly cut stumps where they reproduce and feed on the succulent young bark of seedlings and on developing shoots of older trees. When heavy feeding occurs, the stems of the seedlings are girdled, resulting in tree death.

If you follow recommendations associated with a hazard-rating system that has been developed for these weevils, you can reduce their impact on stands being regenerated. The hazard-rating system is based on logging date and planting date. When logging takes place during the winter and spring, and when planting does not occur until the following December to February, the hazard rating is low. If at all possible, this is the recommended approach to prevent damaging losses to seedlings from reproductive weevils. The stumps have had sufficient time to harden off and are not attractive to the weevil adults.

If logging occurs during the summer months with planting the following February to March, there would be a

medium hazard for weevil activity. With this situation, the seedlings should be treated with a recommended insecticide to prevent the weevils from killing them. Logging during the fall and winter followed with an immediate planting is our highest hazard condition. The stumps are attractive, and if there is a weevil population in the area to respond to the freshly cut stumps, a great deal of damage can occur. Again, with these conditions, the seedlings should be treated with a recommended insecticide in the form of a top dip, root dip, granular, or spray, depending on the conditions.

Pine Tip Moths

At least three species of pine tip moths damage young pines in Mississippi. The Nantucket pine tip moth is the most common, feeding on buds and current shoots of trees up to about 15 feet in height. They also prefer the fastest growing trees. The effect of the feeding is a reduction in height and increment growth. Severe infestations also stunt the trees' growth. The leading terminal shoot is the site attacked most often. As a result of tip moth damage, an excessive amount of compression wood can be formed within the stem, ultimately resulting in reduced lumber quality and pulp yield.

Currently, the primary method of reducing the impact from tip moth damage is the use of insecticides that are timed with each generation. It is generally accepted that the first generation is the largest and most damaging generation. Therefore, it is important that if an insecticide is going to be used, it should be timed to impact the first generation and then timed to reduce subsequent generations. In Mississippi, there may be three to four (generations) spray periods. Monitoring flight periods with pheromone traps can assist in the timing of the applications.

Southern Pine Bark Beetles

The southern pine beetle has been a major cause of mortality to pine stands in Mississippi. With extreme weather events such as Hurricane Katrina, followed by an extended drought, other bark beetles have caused significant mortality to our pine resources. These other beetles are the Ips engraver beetles (three different species) and the black turpentine beetle.

Ips beetles are less aggressive than southern pine beetles and prefer host material that is stressed because of a moisture deficit, slash from harvesting operations, or wind-thrown material. It is essential to recognize that that there are three Ips species that can kill our pines.

The southern pine beetle is a more aggressive species and attacks apparently healthy trees in groups, commonly referred to as "a spot." These beetles are commonly associated with many different adverse conditions, such as natural disturbances (lightning), extremes in moisture, high stand densities or stocking, reduced radial growth rates, and pathogenic fungi.

In addition to following the basic prevention guidelines outlined above, you should follow the following preventive silviculture options:

- favor resistant species
- remove high hazard trees (lightning-struck trees)
- regulate stocking
- mix stands of oak and pine
- minimize logging damage and
- harvest/actively manage overly mature stands.

Of prime consideration is an understanding of the bark beetle/ host interaction and the elements essential in promoting vigor and forest health.

Direct control of the bark beetles mentioned above involves salvage, cut-and-leave, or pile-and-burn. Chemical treatments are limited because in treating standing trees, the treatment has to extend to the first live limbs. Specialized equipment is needed to get the spray to the height of those limbs. In addition, the availability of compounds may be limited because of environmental restrictions.

Ips mortality has greatly increased since Hurricane Katrina. Drought also plays a significant role in increasing the susceptibility of pine to bark beetle attack. Ips beetles prefer material left after hurricanes, tornados, and ice storms as well as thinning slash. Ips and black turpentine beetles do not create spots, as does the southern pine beetle. They attack individual trees throughout a stand, in fencerows, along highways, and in the median, as well as in our yards. Trees are particularly susceptible during the early fall. Pine trees in yards and other recreational settings should receive at least an inch of water a week, if possible, to decrease their susceptibility to Ips attack.

Numerous insects can be seen feeding on pines, but they are seldom of serious concern. Forestry commission employees, extension specialists and county directors, or consulting foresters can assist with their identification. Numerous websites such as www.bugwood.org and www.forestpests.org can also be accessed and provide useful information.

Insects that Affect Hardwoods

Periodically, vast acreages of our hardwood forests are defoliated. This defoliation results in reduced tree growth, seed production, and potential mortality. During stand establishment, cottonwood plantations are particularly susceptible to defoliation by the cottonwood leaf beetle. In the first year, mortality can occur, requiring replanting to fully occupy the space. Generally, the cottonwood leaf beetle can be controlled by the timely application of a biocide or insecticide. Other defoliators, such as oak worms, can also defoliate vast acreages of oaks. While broad scale defoliation can happen, it rarely occurs.

Trunk borers are the most destructive group of insects in hardwoods, and are, therefore, very important economically. Larvae of the carpenter worm and the longhorn beetle attack trees throughout their growth, building large galleries in the wood. Galleries are chambers made under the bark by the insects. These chambers provide spaces for the insects to reproduce, introduce pathogens into the tree, and can directly kill the tree by girdling it.

Bark injuries at entrance holes become ingrown bark pockets. Microorganisms stain and decay the wood along and adjacent to the galleries. This damage may be greatly expanded by carpenter ants that occupy vacated borer tunnels and hollow out larger cavities. Many smaller species of beetles add to the damage. The removal of weak cull trees that harbor both insects and disease will reduce the level of attack in nearby vigorous trees. In addition, trees being removed during harvesting operations should be removed from the forest as soon as possible. They should then be processed or put under water storage to prevent them from being attacked by ambrosia beetles, another group of destructive beetles.

Diseases

Diseases of southern pines cause considerable losses each year. These losses are similar to those caused by insects in the form of mortality, growth loss, and product degradates. Of major concern, are fusiform rust, brown spot, needle blight, pitch canker, and annosum root.

Fusiform Rust

Fusiform rust is one of the most destructive forest diseases in the South in loblolly and slash pines. Longleaf and shortleaf pine are immune. Fusiform rust has increased dramatically in response to the increased use of pine plantations over the past several decades. An abundance of oak trees is positively correlated with the occurrence of fusiform rust. Oak trees serve as the primary source of inoculum for fusiform rust. Early evaluation and strategically timed actions are necessary for the successful management of established stands with high levels of fusiform rust. Management strategies include the following: avoid movement of rust-infected stock from the nursery; use resistant seeds or seedlings, if available; if practical, reduce the oak population.

Brown Spot Needle Blight

Brown spot needle blight is a serious disease of longleaf pine seedlings. Longleaf pine has a grass stage in which the terminal shoots of seedlings do not elongate. This stage may last from one to several years. The more vigorous the trees are, the sooner they begin height growth. By reducing tree vigor, the brown spot disease retards height growth, creating stands that are poorly stocked and uneven in size.

Moisture in the form of rain or dew favors brown spot inoculum production in the forest floor and its spread and ultimate infection of seedlings. The grass stage environment promotes favorable moisture conditions and, therefore, higher infection rates. To prevent needle blight, use high quality vigorous seedlings, prescribed burns, and the appropriate mechanical and chemical site-preparation activities at the time of planting. The use of herbicides, along with scalping, produces ideal planting beds for longleaf, and often results in a shorter grass stage period. Prescribed burns reduce competing vegetation and destroy the fungal spores and diseased tissues that are present.

Annosum Root Rot

Annosum root rot is commonly associated with certain sites and cultural practices. Soils with 12 inches or more of sand in the upper soil layers are considered high-hazard sites, as are old-field sites. Avoid heavy losses on high hazard sites by planting more resistant species such as longleaf pine rather than the more susceptible loblolly or slash pines. On high hazard sites, close spacing favors rapid spread of the disease after the first thinning. Delay this thinning as long as possible, and make it in the summer when few fungus spores are present. In the summer, stump temperatures during the day are usually hot enough to prevent spore ger-

mination. Apply powdered borax to cut surfaces of stumps immediately after felling on high hazard sites during cooler periods.

Pitch Canker

In recent years we have seen an increase in pitch canker in loblolly pine stands in Mississippi, especially in stands close to poultry houses. The amount of dieback that can occur depends on the location of the canker and the number of cankers on a tree. Symptoms include resin soaking under the bark and dieback of growing shoots and branch tips. Resin may also be found flowing from stem or shoot cankers. The disease can occur in seed orchards, nursery seedlings, and planted seedlings, as well as in young plantations. The greatest impact is reduced growth. Lightly or moderately infected trees (less than 20-30 percent crown loss) usually recover unless they are repeatedly infected or are attacked by insects that ultimately cause mortality. Management options for control are not well tested. Salvage harvests and sanitation thinning should reduce the amount of pitch canker annoculum present in the stand.

Removal of severely weakened trees will also reduce the potential breeding sites for the deodar weevil, a known carrier of the pathogen. Pitch canker is best managed by integrating preventive practices into the forest-management plan. This disease has the ability to increase rapidly, changing from endemic to epidemic status in only a few years. Therefore, it is important to regularly monitor your forests so that you can respond quickly if you see symptoms of this disease.

Hardwood Diseases/Pathogens

Rots in hardwood stands are of extreme concern because of the economic impact on the value of a tree that is not harvested at the appropriate time. Individual tree value continues to decline as rot increases annually.

Numerous pathogens can cause a disease if the right conditions exist. There are numerous diseases that can be observed but cause minor damage over all. Forestry commission employees, Extension agents, and universities can assist with their identification of diseases. Numerous websites can also provide useful information, such as www.bugwood.org and www.forestpests.org.

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