

# Pine Bark Beetles in Florida

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Despite the damage incurred by recent hurricanes, notably Hurricane Michael in 2018, the pine tree industry in Florida still is a major contributor to the state's economy. This industry includes the growing of trees for timber, pulpwood, pinestraw, pine rosin (turpentine), and provides for conservation and public enjoyment. According to a recent Florida Department of Agriculture (FDACS) publication, the timber and pulpwood industry employs over 70,000 people and annually contributes greater than \$6.5 Billion to Florida's economy.

There are seven species of pine native to Florida, but the most commonly grown and most economically important are the Slash Pine (*Pinus elliottii*), Longleaf Pine (*Pinus palustris*) and Loblolly Pine (*Pinus taeda*). Like most other plants, pines come with specific insect and disease problems. One of the most common causes of pine death in Florida are bark beetles. There are hundreds of species of bark beetles worldwide. Most are host plant specific and will attack only one species or a group of related plants. Pine bark beetles primarily attack stressed and/or dying pine trees. Typically, healthy and vigorous trees are not infested.

## Pine Bark Beetles

While many of Florida's pest problems come from invasive, non-native species, there are five native species of pine bark beetles that cause problems with native pines. These beetles all range in size from 1/8 to 3/8 inch long and all have distinct characteristics that can help with identification. There are three species of Ips Engraver Beetles (*I. calligraphus*, *I. grandicollis*, and *I. avulsus*) and two species of *Dendroctonus*, including the Southern Pine Beetle (SPB) (*D. frontalis*), and the Black Turpentine Beetle (*D. terebrans*).

One of the unique characteristic traits seen between the different species is the region of the tree which the beetle will first attack. Southern Pine Beetles (*Dendroctonus frontalis*) typically first infest the lower 8 feet of a pine trunk. The four-spined engraver (*Ips avulsus*) attacks the upper crown of the tree, the five-spined engraver (*I. grandicollis*) is found on the lower crown and upper trunk and the six-spined engraver (*I. calligraphus*) is found on the lower and mid-section of the trunk. Finally, the Black Turpentine Beetle (*Dendroctonus terebrans*) is typically found within 2 feet of the ground, though they have been found as high as 8 feet (Fig 1).

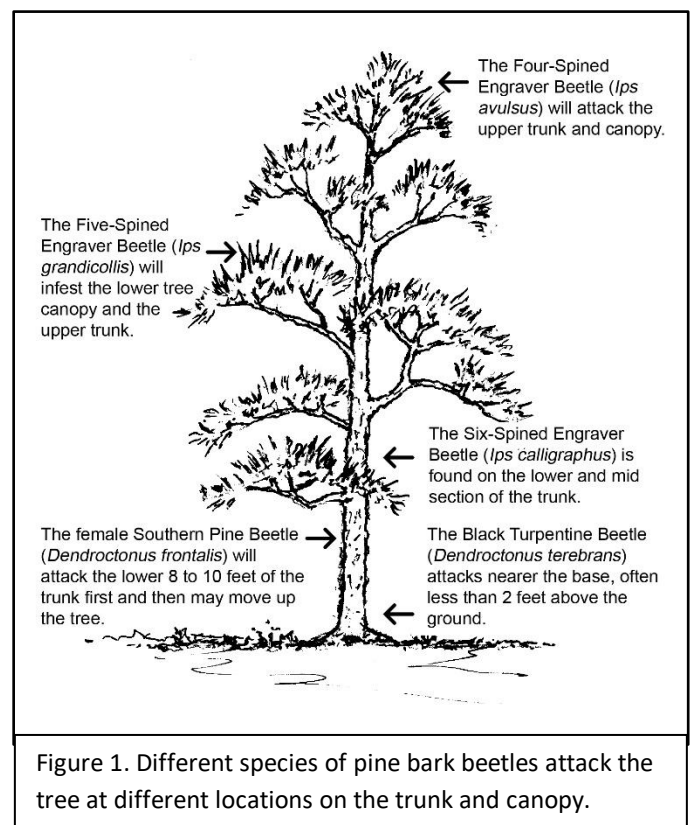


Figure 1. Different species of pine bark beetles attack the tree at different locations on the trunk and canopy.

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All five pine bark beetles feed and breed in the inner bark of pine trees. It is here the insect will go through its four life stages; egg, larva, pupa and adult while feeding on the vascular system of the tree. Most species have multiple generations throughout the year.

## Identifying a Beetle Infestation

As stated earlier, generally pine bark beetles infest stressed pine trees. Severe or prolonged drought, severe or prolonged flooding, excessive cold or heat, root damage, mechanical injury, lightning strike, or even severe bark damage may predispose the plant to infestation. Partial needle loss or changes in needle color from the normal green to yellow, brown or even red are common visual signs to these and other stresses. When a pine tree is stressed it will produce volatile compounds as a survival response. Unfortunately, pine bark beetles are attracted to these chemical.

When bark beetles infest a pine tree, one of the signature signs of infestation is the presence of pitch tubes on the tree bark (Fig. 2). The beetles burrow into the bark in order to reach the nutrient rich cambium tissue. The tree responds by producing rosin (resin/pitch) in attempt to seal the wound and possibly push the beetle out. The rosin may accumulate around the insect's entry point and even run down the outside of the tree.



Figure 2. Pitch tubes due to an infestation of Southern Pine Beetles (*Dendroctonus frontalis*). Picture credit: Bartlett Tree Experts.

Another sign of bark beetle infestation is the presence of frass or 'sawdust' around the base of the tree or caught in the crevices of the bark. Appreciable amounts of this material may be evident if the infestation is severe. Under heavy infestation, rapid bronzing of the trees canopy can occur. This is more typically seen with SPB infections.

## Beetle Management

Most hardwood species, oaks for example, have the ability to survive insect infestations unless they are severe. Pines, however, do not handle stress well and struggle to recover. Factors that determine the chance of survival of beetle infestation include the health of the pine tree at time of beetle entry, the species of bark beetle, the area of attack on the tree and the population of beetle infestation.

Once a beetle has entered the pine tree, the insect is protected by the thick outer bark. Additionally, *Dendroctonus* species may also introduce symbiotic fungi into the tree. The fungus, commonly called blue stain fungus, may further hasten the death of the tree by infecting the tree's vascular system blocking the flow of water.

Therefore, once a beetle infected pine tree is showing symptoms of decline it is probably too late to save it. In such cases the best option is to remove the tree in a timely manner. If caught early enough and in an isolated area, it may be possible for the tree to survive with appropriate treatment and care.

Given the fact that saving a beetle infested pine tree is so difficult, what is the best way to protect your pines? The best way is proper management. Consult with an International Society of Arboriculture (ISA) certified arborist, urban forester, and/or tree care professional on steps you can take to alleviate and reduce tree stress. Reducing stress means healthier trees. Healthier trees are much more likely to successfully resist a pine bark beetle infestation.