Pine Bark Beetles

Habitat Management

BACKGROUND

Pine bark beetles attack and kill pine trees, and are relatively common pests of pine forests. The feeding and tunneling activities of adult and larval pine bark beetles eventually girdles an infested tree (e.g., disrupts the transport of water and nutrients up and down the stem) and quickly kills it.

Pine bark beetles live under the bark of pine trees. Adults infest new trees by chewing through the outer bark, leaving small round holes in the bark that may ooze pine resin (called "pitch tubes"). Adult pine bark beetles create tunnels or galleries under the bark where they mate and lay eggs. Larval beetles hatch from the egg galleries and create new tunnels, feeding on the inner bark of the tree. When the larvae finally develop into adults, they bore a hole out of the tree and fly to another. The life cycle for these beetles can be as short as 21 days in the summer months. Pine bark beetle activity generally stops when temperatures drop lower than 50º F.

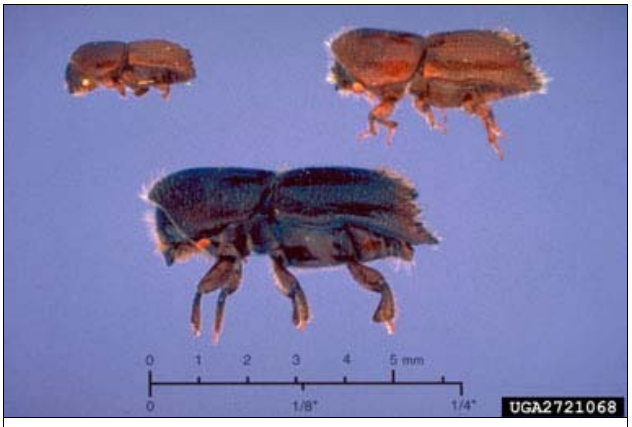
There are five species of pine bark beetles known to occur in the pine forests of Texas, including:

- Southern pine beetle (*Dendroctonus frontalis*) is an extremely destructive pest and has been known to infest thousands of acres of pine trees in a single area. Fortunately, this species is not known to occur in the Lost Pines of Bastrop County;
- Three species of pine engraver beetles (*Ips* spp.) occur in Texas, but rarely attack healthy trees and generally infest only scattered trees or small groups of trees. Pine engraver beetles are known to occur in Bastrop County and are likely to be the most common cause of pine beetle damage to trees in the Lost Pines area;
- Black turpentine beetle (*Dendroctonus terebrans*) is the least aggressive of the five species in Texas and commonly infests trees that have already been attacked by other pine bark beetles. Pine trees may survive infestations by this pest, if it is the only species present.

Pine trees that are stressed or weakened are most vulnerable to attack by pine bark beetles. Only the southern pine beetle is known to attack healthy trees. Drought, flooding, disease, or damage from fire, lightening, hail, wind, human activity, and other sources can make a tree susceptible to infestation. In Bastrop County, attack is most likely to come from pine engraver beetles and the severity of the infestation is generally tied to the condition of the trees in the area. For example, pine engraver beetle activity becomes much more pronounced during periods of severe drought.

In residential areas, construction activities can stress existing pine trees and create opportunities for infestation by pine bark beetles. Damage or stress can result from soil compaction, surface grade changes, or bark injury by vehicles or heavy equipment.

It is nearly impossible to save a tree that has been infested with pine bark beetles, so preventing attacks is extremely important.



Adult *Ips* pine bark beetles.
Photo credit: John L. Foltz, University of Florida, www.forestryimages.org.

GETTING IT DONE

Step 1: Be Familiar with the Signs of Attack

Infestation from pine bark beetles is apparent in several ways. Since trees typically die very quickly after colonization , identifying an infestation may not help you save the affected tree. However, catching an infestation early may help you prevent the spread of these pests to other trees in the area. Look for the following signs of infestation:

- A reddish-brown dust on crevices in the bark or around the base of the tree. This dust is the result of adult beetles boring through the outer bark of the tree

and is often the first sign of infestation.

- Trees with sufficient moisture will commonly exude sap from boring holes. These pitch tubes are also frequently reddish-brown in color, since the resin is mixed with boring dust. Pine engraver beetles commonly enter trees on the flat areas of individual bark plates and pitch tubes on these areas may indicate an infestation of pine engraver beetles. (In contrast, southern pine beetles bore into the crevices between bark plates.) Trees that are severely stressed by drought may not develop pitch tubes.

Pitch tubes on pine bark made by *Ips* beetles.
Photo credit: Texas Forest Service

- Pine bark beetles create tunnels under the bark, and the shape and location of these tunnels can help you identify the species causing the infestation (see inset). These tunnels are on both the inside of the bark and the outside of the sapwood. The presence of these tunnels is a sure sign of infestation.
- Colonization by pine bark beetles quickly kills a tree, which is evident by all or most of the needles at the top of the tree turning yellow, then red. This transformation can occur in as little as three weeks during hot, dry summers.

  However, you should note that it is common for the needles on small, scattered branches to turn red in the fall (these are called "flags") and is not a sign of pine beetle infestation. Also, second year needles toward the inside of a branch tend to discolor and may fall off in the fall or during periods of drought. This is a normal occurrence and not a sign of infestation.

Gallery Characteristics of Pine Bark Beetles

The galleries of pine bark beetles include main tunnels made by adults and side tunnels made by emerging larvae. The general shape of the main galleries can help you identify the type of beetle colonizing the tree.

Southern Pine Beetle - Galleries are winding and often "S" shaped.

Pine Engraver Beetles -

Galleries are typically vertical and resemble "H" or "Y" shapes. Different species of pine engraver beetles attack different parts of the tree (upper, middle, or lower parts of the trunk).

Image credit: Texas Forest Service Archives, Texas Forest Service, www.forestryimages.org.

Black Turpentine Beetle -

Galleries are typically in the lower part of the trunk and extend downward from the point-of-entry.

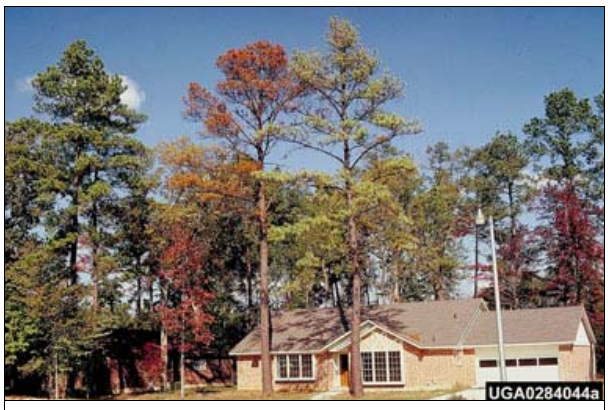
Image credit: Ronald F. Billings, Texas Forest Service, www.forestryimages.org.

Step 2: Prevent Infestations On Your Property

Keeping pine trees healthy and in good condition is the best way to help prevent infestations of pine bark beetles and other insects and diseases. Practice appropriate tree protection practices during home construction and landscape maintenance. Applying water and fertilizer to important trees in your landscape can also help them deal with the stress of construction activities and natural events, such as drought.

The Texas Cooperative Extension Service and the Texas Forest Service recommend the following tree protection and maintenance practices to keep your landscape trees healthy:

- Avoid impacting the soil under the canopy of the tree. Soil compaction or disturbance from the use of heavy machinery, tractors, or trucks in this zone can severely damage the ability of tree roots to uptake oxygen, water, and nutrients from the soil. Protect the area under



Ips damage to pine trees in an residential area.
Photo credit: Ronald F. Billings, Texas Forest Service, www.forestryimages.org

the canopy of important trees by clearly marking the area with signs and/or fencing as a "no impact" zone.

- If grade changes around existing trees are necessary to prepare your home construction site, follow the recommendations of the Texas Cooperative Extension Service regarding the installation of fill, construction of tree wells, corrective pruning, or lowering of the existing grade. See the publication on "Protecting Existing Landscape Trees from Construction Damage Due to Grade Changes" by E. Janne and Dr. D. Welsh available free of charge from the Extension Service website (http://aggie-horticulture.tamu.edu/extension/ornamentals/protect/protect.html) for more information.
- Many trees benefit from regular deep watering, especially during periods of drought. Apply approximately 1 to 4 inches of water to the area under the canopy of the tree every seven to ten days. Water should be applied slowly in the early morning or evening to allow deep penetration into the soil. Be careful not to overwater, especially in clay soils. Perforated soaker hoses laid out under the tree canopy are a good way to slowly deliver water to the tree without wasting water to runoff or excess evaporation. Test the soil to a depth of approximately 4 inches to make sure it is dry before applying additional water.
- Fertilization may help keep your tree healthy. Prior to fertilizing, have your soil tested to determine which nutrients, if any, you should be adding to your soil. The Texas A&M University Soil, Water, and Forage Testing Laboratory can test soil samples and provide recommendations for fertilizing (see http://soiltesting.tamu.edu for more information).
- Avoid damage to tree trunks from lawnmowers and trimmers. This type of damage is common in residential landscapes and repeated damage can severely affect the tree's ability to distribute water, oxygen, and nutrients between the root system and the canopy. Protect the base of trees by creating a mulched area around the trunk that is not mowed and requires less weeding. Alternatively, use a plastic trunk protector to shield the tree from damage.
- Promptly coat all pruning cuts and other wounds with wound paint. Sap exuding from fresh wounds attracts insects and can attract disease vectors.

Step 3. Remove Infested Trees and Wood

The Texas Forest Service recommends that landowners promptly cut down pine trees that are visibly infested with pine bark beetles (e.g., some life stage of the beetle is currently in the tree). However, care should be taken to make sure that felling an infested tree does not damage surrounding trees, since damaged trees are more susceptible to infestation. Once the larvae have matured and emerged from an infested tree, removing the tree will no longer provide any control benefits. Removal may still be warranted if the dead tree poses a safety risk (dead pine trees become quite brittle in 6 to 10 months).

Removing healthy trees near infested trees will not help control the spread of the most common types of pine bark beetles in Bastrop County. (Remember, *Ips* beetles tend to attack scattered individual trees or small groups of trees, not large clusters of trees).

Cut trees and limbs that are infested with pine bark beetles should be burned as soon as possible, since the beetles may continue to emerge from the cut wood. If burning is not an option due to burn bans or other factors, place cut wood in a sunny area and wrap it with a tarp. The tarp may help prevent adults from moving to new trees, and the heat generated by the sun may help kill remaining beetles and larvae under the tarp.

Step 4: Chemical Applications

There are a few pesticides currently registered for use to control pine bark beetles. However, chemical treatments are not recommended for controlling pine bark beetle infestations in residential settings. These treatments require application of pesticide to the entire trunk of the tree — from the ground to the start of the canopy. This type of application has a high potential to drift onto unintended areas, where the chemicals may contact other landscape areas, buildings, people, or pets and have unintended consequences. Chemical treatments may also be costly, especially given the scattered nature of pine bark beetle infestations in this area.

ADDITIONAL INFORMATION

If you suspect that pine bark beetles are killing your pine trees, contact the Texas Forest Service Office of Forest Pest Management in Lufkin, Texas. The Texas Forest Service entomologists (biologists specializing in insects) should be able to assist you in properly identifying the problem and suggesting an appropriate course of action.

TEXAS FOREST SERVICE
The Texas A&M University System

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Forest Pest Management
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Lufkin, TX 75902-0310
Phone: 936–639–8170
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Other resources that are available online include:

- The Texas Forest Service website has a section devoted to forest pest management, including information on pine bark beetles at http://texasforestservice.tamu.edu/forest/pest/default.asp.
- Fact Sheet: Tree Killers… Pine Bark Beetles by Jack E. Coster, Area Extension Entomologist, East Texas Research and Extension Center, Texas A&M University. Texas Cooperative Extension Service publication available online at http://extensionforestry.tamu.edu/publications/tree_killers_spb.htm.
- Wood-boring Insects of Trees and Shrubs by B. Drees, J. Jackman, and M. Merchant, Texas A&M University. Texas Cooperative Extension Service publication B-5086. Available online at http://insects.tamu.edu/extension/bulletins/b-5086.html.
- Protecting Existing Landscape Trees from Construction Damage Due to Grade Changes by E. Janne and D. Welsh, Texas Cooperative Extension Service, Texas A&M University. Texas Cooperative Extension Service publication available online at http://aggie-horticulture.tamu.edu/extension/ornamentals/protect/protect.html.