

FACT SHEET

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Tree Killers...

Pine Bark Beetles

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More pines are killed by bark beetles than by any other group of insects. All common pines in Eastern Texas are attacked by the beetles. Although they usually breed in forest trees, pines around yards and homes are also selected for breeding places.

DESCRIPTION AND HABITS

Five species of bark beetles are responsible for most of the damage to pines—the southern pine beetle (*Dendroctonus frontalis* Zimm.), the three southern *Ips* engraver beetles (*Ips avulsus* Eich., *Ips calligraphus* Germ., and *Ips grandicollis* Eich.) and the black turpentine beetle (*Dendroctonus terebrans* Oliv.).

Bark beetles spend most of their lives beneath the bark of their host trees where adult beetles chew out tunnels, or *galleries*. Upon hatching from eggs laid along the gallery sides, the young larvae bore away at right angles. When fully developed, the larvae transform to pupae and then to adult beetles. They chew through the bark and fly to attack other trees. The tree's death results from girdling by adults in forming the egg galleries, by larval feeding or tunneling and by fungi brought into the tunnels by the attacking beetles.

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Figure 1. Three species of pine bark beetles, left to right: *Dendroctonus frontalis*, *Ips calligraphus*, *Dendroctonus terebrans*. Note the concave, truncate and toothed hind end of the *Ips* beetle.

Southern pine beetle

This is the most destructive insect pest of pines in the South. Outbreaks may cover many acres and kill thousands of trees. Pines of all sizes are attacked, and even healthy, vigorous trees are killed by this beetle during epidemics.

The brown or black adult beetle is from 3/32 to 3/16 inch long. Its hind end is convex and rounded, in contrast to the concave, truncate and toothed hind end of the *Ips* beetle (Figure 1). Winding, "S"-shaped egg galleries are made by adult

beetles beneath the dry outer bark (Figure 2). Larvae are white and legless with glossy, reddish-brown heads; their bodies are wrinkled and curved. Under optimum conditions, the entire life cycle may be completed in 30 days, and 5 to 7 generations may occur each year. The insect overwinters beneath or within the bark in the egg, larval, pupal or adult stage.

Ips engraver beetles

The three species of engraver beetles are similar in habits and life histories, but can be readily distinguished by their size and the number of projections or teeth on their hind end. *Ips* beetles are attracted to trees weakened or injured by some natural or man-caused injury. Lightning-struck trees are especially attractive to the beetles and often are the center of spread to nearby trees. Normally they attack and kill only one or a few trees in a given spot, but if conditions are satisfactory, hundreds of trees may be killed.

In contrast to the "S"-shaped galleries made by southern pine beetles, adult *Ips* beetles make either "H"- or "Y"-shaped tunnels (Figure 2). The hind end of adult *Ips* are concave and armed with small spines or teeth. Larvae resemble those of the southern pine beetle.

Ips avulsus, smallest of the engravers, is a brown beetle about the size of the southern pine beetle. There are 8 projections (4 on each side) on its rear end. It prefers to attack the upper stem and limbs of trees. One generation may be completed in 20 to 30 days with 8 to 10 generations occurring each year.

Ips grandicollis is the medium-sized engraver and 1/8 to 3/16 inch long. This brown beetle has 5 projections at each side of its rear end and commonly invades the middle and upper trunk of pines. There are 4 to 6 generations per year.

Ips calligraphus has 6 projections at the rear of each wing cover and is the largest of the three beetles—from 3/16 to 1/4 inch long. It tunnels in the lower parts of the main stem. There may be 4 or 5 generations per year.

Black turpentine beetle

Trees with the bark injured or burned, trees with roots damaged by machinery or compaction, and fresh stumps are attractive to the black turpentine beetle. Attacks usually are limited to the lower 6 to 8 feet of the trunk. Turpentine beetles do not attack a tree in such large numbers as do the other bark beetles; therefore, the tree may recover from their attacks. Adult beetles construct

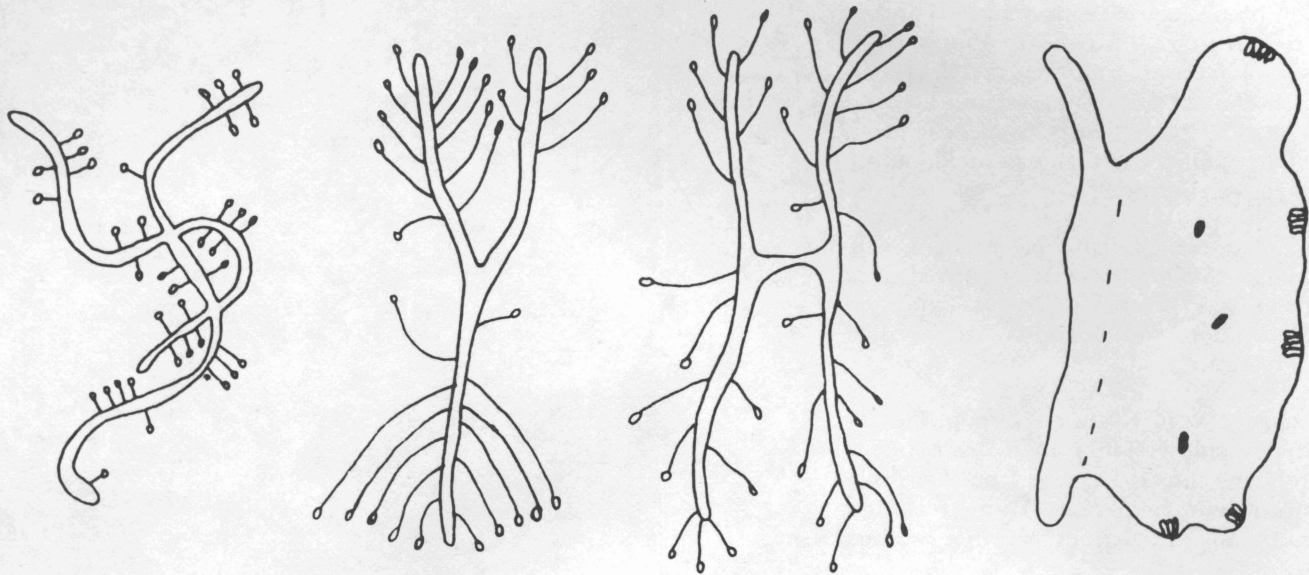


Figure 2. Left to right: "S"-shaped egg galleries of the southern pine beetle; "Y"- or "H"-shaped egg galleries of the *Ips* engraver beetles; "D"- or fan-shaped galleries of the black turpentine beetle.

egg galleries downward from entrance holes, with the gregariously feeding larvae killing large patches of inner bark. Thus, a large fan-shaped or "D"-shaped gallery results (Figure 2).

This black beetle is the largest pine bark beetle in the South, ranging from 1/4 to 3/8 inch in length. The hind end is convex as in the southern pine beetle. Egg galleries extend downward from the point of entrance, winding slightly. Large, white, legless larvae feed in groups next to the egg galleries, in contrast to the separate larvae feeding of other Texas bark beetles. Two generations normally are completed in a year.

Inter-relationships of bark beetles

A tree may be killed by the attacks of a single species of bark beetles. Commonly, however, two or more species attack the same tree to bring about its death. *Ips* beetles may be attracted to trees initially attacked by southern pine beetles and vice versa. Egg galleries of different bark beetle species may be intermixed in the same section of a host tree.

SIGNS OF ATTACK

Although the different bark beetle species have different habits and life histories, symptoms exhibited by infested trees are similar for all species.

Beetle-injured trees can be difficult to detect at an early stage because the small yellowish-white or reddish-white masses of resin, called "pitch tubes," marking the locations of beetle entry are often inconspicuous. In fact, during very dry weather, there may be no pitch tubes but only reddish boring dust in the bark crevices.

Heavily infested trees will exhibit changes in foliage color from dark green through light green, yellow and sorrell to a final reddish brown. These changes usually occur over a time period of 1½ to 3 months. During the summer, initial fading may not occur until 3 or 4 weeks after the bark beetles have entered the trees, so that beetle emergence takes place about the time affected trees begin to fade. If trees are infested in late fall, they may remain green all winter and not fade until after insect emergence the following spring.

Positive identifications of bark beetle infestations are made by removing a square of bark. Exposed on its inner surface and on the outer wood surface of the tree are the characteristic gallery patterns of the bark beetles.

It is important that homeowners carefully and frequently inspect pine trees for signs of beetle activity.

PREVENTION OF INFESTATION

Trees heavily attacked by *Ips* beetles and southern pine beetles are doomed to die. Therefore, practices to prevent the beetles from successfully attacking are very important. In residential areas, practices can begin during construction of a new home. Heavy traffic by trucks, equipment and workers compacts the soil in the root zone, disrupting water and air movement, and reducing the vigor of the tree. Equipment may damage the bark directly. Raise or lower the soil grade around a tree carefully to prevent drastic alterations in the normal soil water movement patterns. Tree protection practices are given in Texas Agricultural Extension Service publication MP-788, *Protection of Existing Landscape Trees*.

In established yards, proper watering and fertilization help reduce the possibility of bark beetle infestation. During periods of dry weather, water trees often. Apply fertilizer, such as 10-8-6 formulation, at 2 pounds for each inch in diameter of the tree trunk. Apply only 1 pound of the formulation per inch to trees less than 6 inches in diameter.

Trees may be protected for 2 to 6 months by spraying with lindane or benzene hexachloride (BHC). Begin spraying at the uppermost point that can be reached with a power sprayer and work down to the base of the tree. Spray until the solution runs down the bark crevices. Use water emulsions containing a surfactant for better penetration and adherence of the insecticide to the bark. Lindane is a highly refined formulation of BHC and lacks the musty odor of BHC.

The general strategy is to keep ahead of the bark beetles. Do not make the mistake of spraying dead, insect-vacated trees when it is the green, unattacked trees that need protection.

CONTROL OF BARK BEETLES

Predators, parasites and diseases take their toll of bark beetles but cannot be relied upon to stop infestation of individual trees or small groups of trees. Remove or spray trees that contain bark beetle larvae and adults to prevent infestation of other pines. Under forest conditions, use salvage cutting as much as possible. This method has two advantages—the timber owner may recover some of

his monetary losses, and the natural complex of predators and parasites is not disrupted by insecticide applications.

In home yards, cut and burn infested pines, or spray them with lindane or BHC. Protect surrounding, uninfested trees from attack with the insecticides indicated in Table 1.

Table 1. Dilution of Insecticides

Insecticide to be used for:	Amount of 17% lindane emulsifiable concentrate required*
Southern pine beetles Ips engraver beetles	1 gal. concentrate in 32 gal. of water
Black turpentine beetles	2 gal. concentrate in 32 gal. of water
Prevention of bark beetle attack on uninfested trees	1 gal. concentrate in 32 gal. of water

*If using concentrates in which the percentages of active ingredients differs from these percentages, mix proportionally with water.

Power sprayers with extension connectors are best for spraying standing trees. If these are not available, a hand pressure type sprayer of 1½ to 3 gallon capacity is suitable. High pressure sprayers are not needed where the insecticide is being applied to felled trees. Use hand pressure sprayers, hose-on sprayers or even simple garden watering cans to apply the insecticide to the bark. Turn felled trees to insure that all bark surfaces are soaked with the chemicals. Do not spray trees when the bark is wet.

INSECTICIDE SAFETY PRECAUTIONS

The Federal Environmental Pesticide Control Act of 1972 (Public Law 92-516) in part prohibits the application of any pesticide in a manner inconsistent with its labeling. This means that a pesticide cannot be used unless it is registered for the specific pest on the specific plant as indicated on the product label. Consequently, some chemicals formerly used by homeowners and pesticide applicators can no longer be used.

The status of insecticide label clearances is subject to change and changes may have occurred since this publication was printed. County Extension agents and Extension entomologists are notified as these changes occur.

The pesticide *USER* is always responsible for the effects of pesticide residues on his own plants as well as problems caused by drift from his property to other properties or plants. Always read and follow carefully all instructions on the product label.

Avoid prolonged skin contact with lindane or BHC. Chemicals may be absorbed by the skin and produce harmful effects. Wash exposed skin areas with generous amounts of soap and water. Lindane and BHC are toxic to fish and wildlife. Avoid contaminating water impoundments and drainage basins.

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