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House and Landscape Pests

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 in urban areas also provide 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 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 adult beetles. They chew through the bark and fly to attack other trees. The tree's death results from girdling of the cambium layer either by adults forming the egg galleries, by larval feeding or by fungi brought into the tunnels by the attacking beetles.

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.

All life stages of the Southern pine beetle winter in bark. When adults emerge in the spring, they do not attack healthy, living trees. Instead, they seek out and invade trees attacked but not killed the previous fall. Generally, they attack the middle and upper trunk first, then continue down to within 5 feet or less of the ground. In the southern states, adults emerge in March and may attack the lower trunk first.

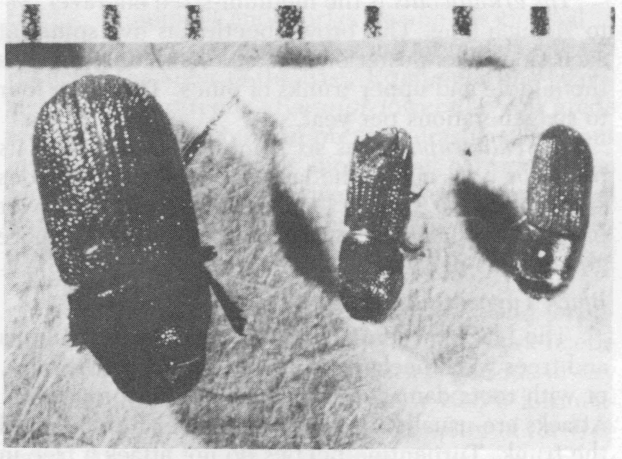

Figure 1. Three species of pine bark beetles, left to right: Dendroctonus frontalis; Ips calligraphus; Dendroctonus terebrans. *Note the concave, truncate and spined posterior of the* Ips *beetle.*

The brown or black adult beetle is from 3/32- to 3/16-inch long. Its posterior end is convex and rounded in contrast to the concave, truncate and spined posterior 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

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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 five to seven generations may occur each year.

Ips Engraver Beetle

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 posterior ends. *Ips* beetles are attracted to trees weakened or injured by some natural or man-caused injury. Lightning damaged trees are especially attractive to the beetles, and often are the center of spread to nearby trees. Normally, *Ips* beetles 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 posterior ends of adult *Ips* are concave and armed with small spines. 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 eight spines (four on each side) on its posterior end. It prefers to attack the upper stem and limbs of trees. One generation may be completed in 20 to 30 days, with eight to ten generations occurring each year.

Ips grandicollis is the medium-sized engraver, ⅛- to 3/16-inch long. This brown beetle has five spines at each side of its posterior end and commonly invades the middle and upper trunks of pines. There are four to six generations per year.

Ips calligraphus has six spines at each side of its posterior end, and is the largest of the three beetles — from 3/16- to ¼-inch long. It tunnels in the lower parts of the main stem. There may be six or more generations per year.

Black Turpentine Beetle

The black turpentine beetle attacks fresh stumps and trees with mechanical or burn injury to the bark, or with roots damaged by machinery or compaction. Attacks are usually limited to the lower 6 to 8 feet of the trunk. Turpentine beetles do not attack a tree in such large numbers as the other bark beetles; therefore, the three may recover from their attack. Adult beetles construct egg galleries downward from entrance holes. Larvae feed in groups next to the egg galleries, killing large patches of inner bark and forming large fan-shaped or "D"-shaped galleries (Figure 2).

This black beetle is the largest pine bark beetle in the South, and ranges from ¼- to ⅜-inch in length. The posterior end is convex as in the southern pine beetle. Larvae are large, white and legless. Two generations normally are completed in a year.

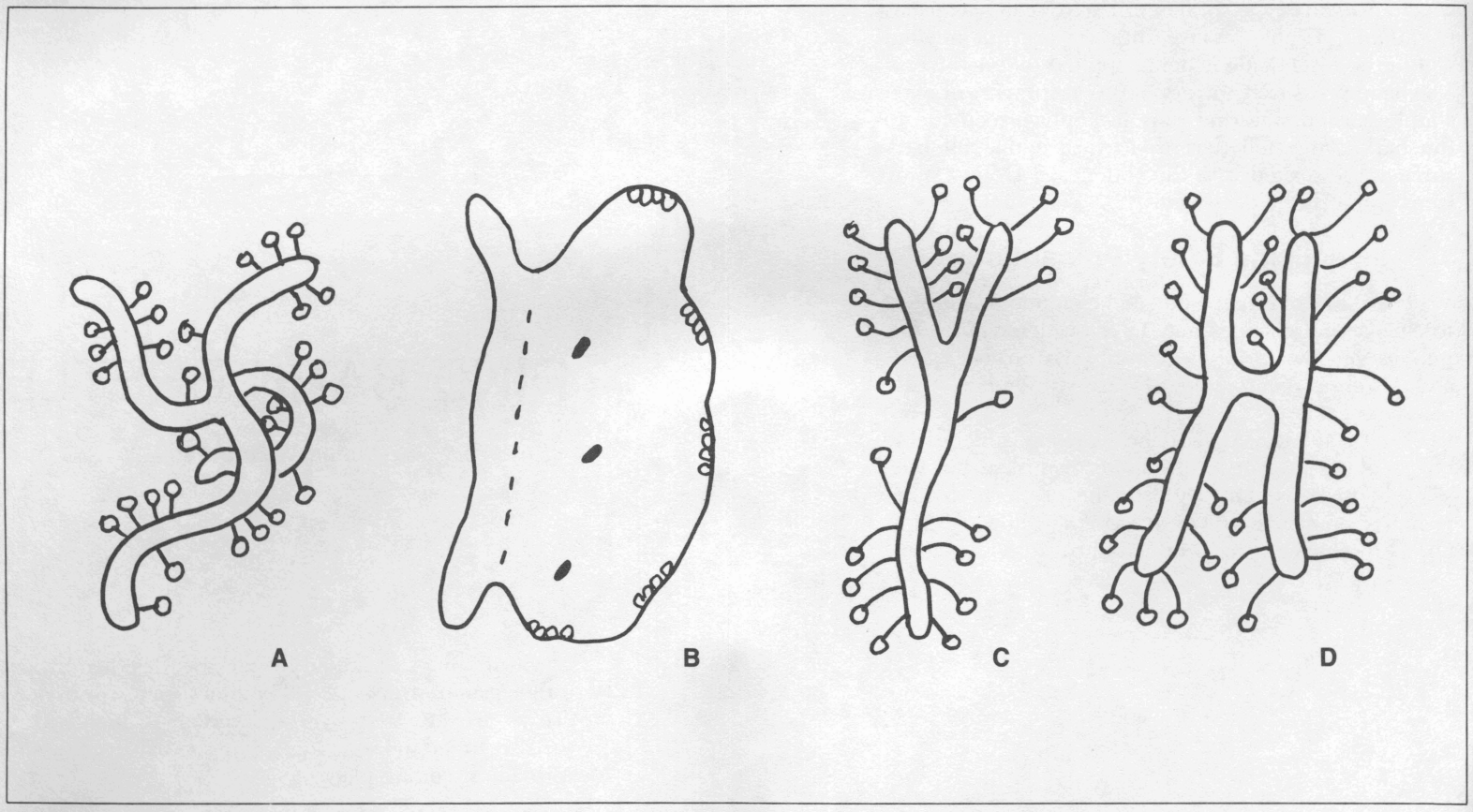

Figure 2. A: "S"-shaped galleries of the southern pine beeetle; B: "D"- or fan-shaped galleries of the black turpentine beetle; C and D: "Y"- or "H"-shaped galleries of the Ips *engraver beetles.*

Interrelationships of Bark Beetles

A tree may be killed by the attacks of a single species of bark beetle. Commonly, however, two or more species attack the same tree. *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.

Bark 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," which mark the points 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.

Figure 3. Pitch tubes on tree trunk are a sign of bark beetle attack.

The foliage of heavily infested trees changes from dark green to light green, yellow, sorrel, and finally reddish brown. These changes usually occur over a 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 identification of bark beetle infestations are made by removing a square of bark. Exposed on its inner surface and on the outer 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. Be on the alert for any foliage color change as an indication of pine bark beetle activity. But remember that foliage color change in pines is a slow process and may not occur until 3 to 4 weeks after bark beetles have entered the tree, or until the following spring after a fall attack.

Prevention of Infestation

Trees heavily attacked by *Ips* beetles and southern pine beetles are doomed to die. Therefore, it is important to prevent the beetles from successfully attacking. In residential areas, prevention 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 L-1309 *Protecting Existing Landscape Trees from Damage Due to Grade Changes*.

In established yards, proper watering and fertilization help reduce the possibility of pine bark beetle infestation. Water trees often during periods of dry weather. Apply fertilizer, such as a 10-8-6 formulation, at 2 pounds for each inch in diameter of the tree trunk. Apply 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 chlorpyrifos (Dursban 4E®). Apply according to label directions. 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. Protecting tall trees may require employing the services of a commercial tree spraying company.

The best 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, healthy 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 chlorpyrifos (Dursban 4E®) to protect surrounding, uninfested trees.

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 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 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 property or plants. Always read and follow carefully all instructions on the product label.

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