

PINE BARK BEETLES

OR

“BUGS”

HOW TO CONTROL THEM

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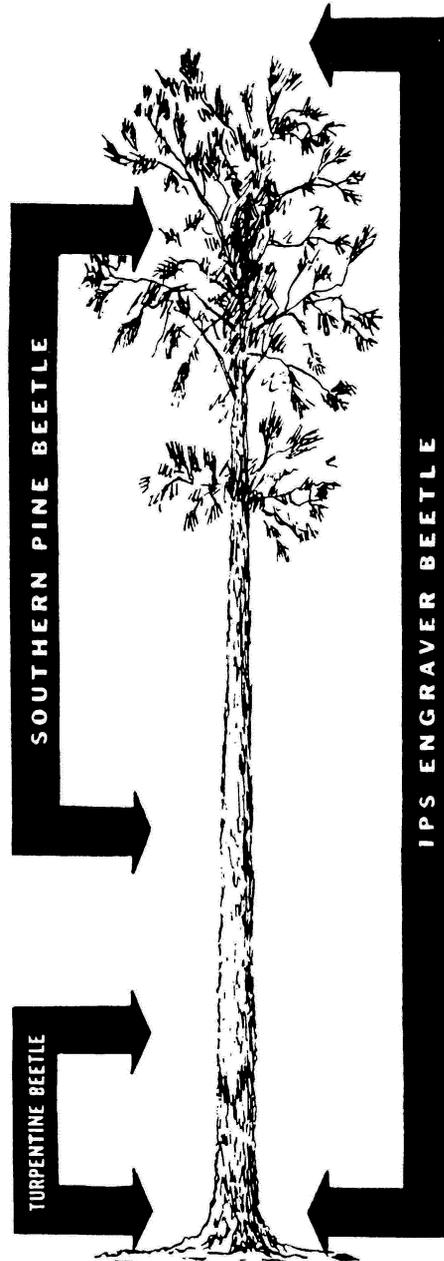
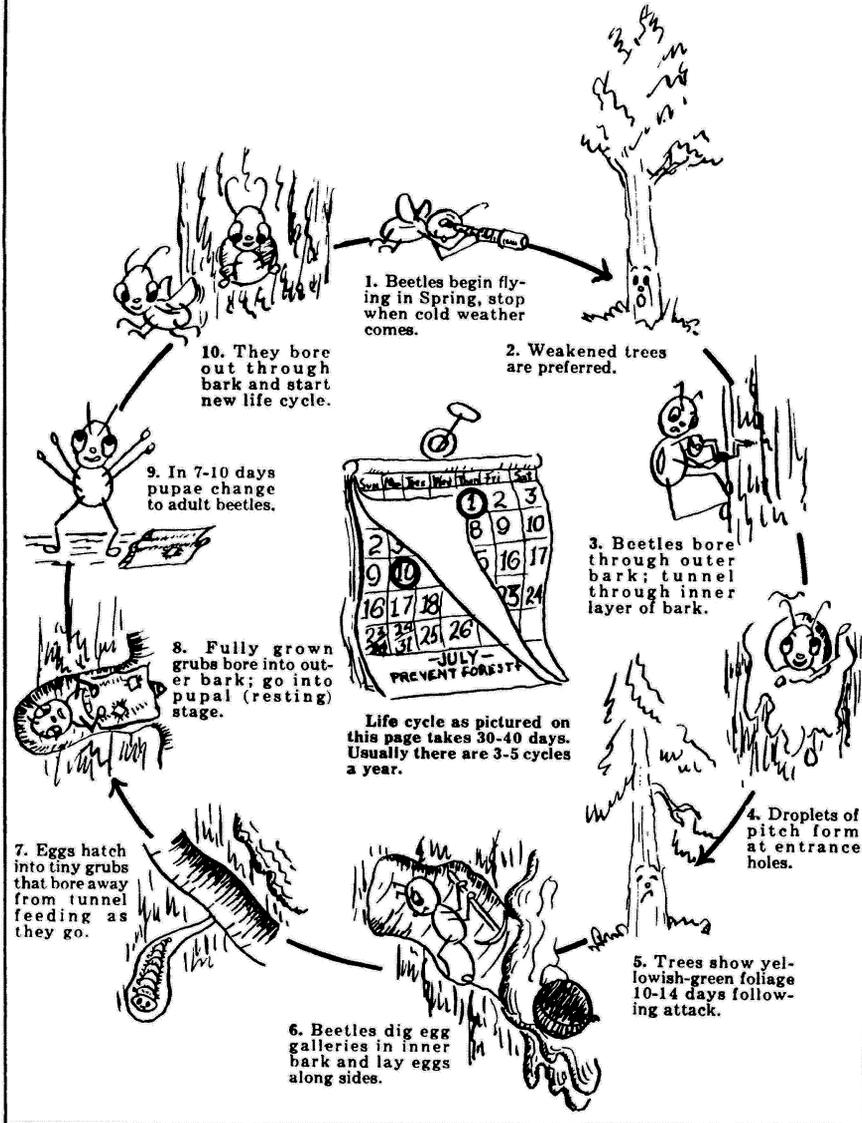


Diagram showing portion of tree normally attacked by three principal pine bark beetles.

Life Story of a Southern Pine Beetle



Pine Bark Beetles or "Bugs"

HOW TO CONTROL THEM

by WILBUR O'BYRNE, *Forester**

Almost every year reports come from some part of Virginia that bark beetles, borers, or just plain "bugs" are killing pine trees. One inquiry may involve a single tree in a yard, another all of the pines on a thousand acres, but in each instance, the owner wants to know how to get rid of them.

It is not possible to put a finger on just what causes many of these epidemics. Drouth, injury, sudden change of grade around the tree, or some other unfavorable growing condition can often be identified as the reason the insects are able to multiply, but the immediate cause of the death of the tree is usually the work of one of three insects — The Southern pine beetle,¹ the turpentine beetle,² or one of the *Ips* beetles.³ All three are known to work on all of the pines native to Virginia and on both young and mature trees — provided other conditions are favorable. Much alike in some ways, they differ as to where they attack a tree (see diagram on front cover) and how they work. So each calls for a different method of control.

How They Are Alike

All three are tiny, dark brown to black beetles with hard shells over folded wings. They range from about one-third the size of a grain of wheat to as large as some of the smaller varieties of soybean seeds. They can fly great distances. All three enter the tree by cutting small holes through the outer dry bark to get at the soft portion next to the wood. Here they lay eggs about the size of tobacco seed, which hatch into tiny white grubs known technically as larvae. The grubs feed in the soft inner bark and when they have reached full size, go through the pupae or resting stage, during which they change from a grub to a beetle. As beetles, they cut their way through the bark and fly to fresh trees, where the process is repeated. (See life cycle chart.)

*The writer is indebted to A. L. Hetrick, formerly with the Virginia Agricultural Experiment Station, on whose field work much of the material used in this circular is based.

¹ Scientifically known as *Dendroctonus frontalis*.

² *Dendroctonus terebrans* and *D. valens*.

³ *Ips calligraphus*, *Ips grandicollis*, and *Ips avulsus*.

All three beetles prefer trees that have been weakened by fire, drouth, lightning, or other injury, especially injury to the roots such as is often caused by hogs rooting. If the beetles attack in sufficient numbers, they are capable of killing healthy trees. Each female may lay a hundred or more eggs. In warm weather, broods develop rapidly and there may be as many as four or five generations in one summer. It is easy to see why epidemics develop so quickly. It also shows why it is necessary to recognize an epidemic in the early stages and take control measures promptly.

All species are attacked by certain birds, by diseases, and by other insects. If the tree which is under attack is healthy, many of the smaller grubs may be drowned in the flow of resin; and in severe cold weather, they may be frozen out. As a result of these natural controls, epidemics frequently subside as suddenly as they started.

When live trees are attacked, they fight back by pouring resin or "pitch" into the egg galleries. The adult beetles, having legs, are able to push this pitch out through the entrance holes, where it accumulates as yellowish tubes or "pitch chimneys." As the bark loses its freshness, the beetles may also push out a powdery dust, which accumulates around the base of the tree until it is quite noticeable.

How They Differ

So much for the similarity. Let us now look at the differences, and see how those differences can be used to recognize which beetle is present and how to fight it.

Because they are small and live in the bark, many people never see bark beetles. If they do see them, it is hard for them to believe that such a small insect could do so much damage. But if the beetles are hard to see, the marks they leave on the inner surface of the bark are not. These markings are not only conspicuous but are very characteristic and remain visible for a long time. In describing the different beetles, therefore, more emphasis will be placed on the character of their work than on the insects themselves.

Southern Pine Beetles

Egg galleries long and winding.

The most destructive of the group is the Southern pine beetle. This is the insect that swept Virginia in the early nineties and killed millions of pines. The adult is about one-third the size of a grain of wheat and works only in the bark of the upper



Markings left on inner surface of pine bark by the Southern pine beetle. Note the twisting, even crossing, egg galleries made by the adult beetle, and the short side galleries made by the grubs. In the pupal chambers at the ends of the short galleries, the grubs change to the beetle stage. The newly formed adults then cut their way out and fly to fresh trees.

portions of the trunk of pine trees. It rarely comes within ten feet of the ground. The egg galleries, along which the female lays her eggs, are long and winding. They frequently cross and although they may mark the surface of the wood, most of the activity takes place in the bark. The markings remain plainly visible until obliterated by scavenger insects which follow to work in the dead bark. The side galleries, made by grubs, are slender at first but expand into chambers where the change to the adult takes place.

Because the Southern pine beetle is able to breed in living trees, it is more likely to become epidemic than either of the other two. But by the time the tree top turns brown, the insects that killed

it will have moved on. The only reason, then, for cutting dead trees is to use the wood before it becomes "doty."

The most effective control measure is to cut all affected trees *as soon as they show the first signs* of the needles fading. During the winter there is a period of several months when the beetles do not fly. This makes it possible to clean up an epidemic more easily in the winter than in the summer when the adults frequently start to emerge before the tree tops show any sign of fading. The infested bark should be removed and burned, or the logs sawn and the slabs burned promptly. As a safety measure, it is also well to cut a few trees beyond the group in which beetles can be detected, in order to catch any that may have spread to them and just started to work.

Ips Beetles

Egg galleries fairly straight.

This is a group of several species which differ mostly as to size. They prefer trees that have been injured but also breed in



Markings left by one of the Ips beetles on inner surface of pine bark. The long, straight egg galleries are made by the adult beetle and the short, tapering side galleries, by the developing grubs. Side galleries and pupal chambers are well-formed, showing that most of the grubs developed into beetles unhindered.

Photo courtesy, U.S.D.A. Bureau of Entomology

Markings left by another species of Ips beetle. Eggs galleries are long, straight, and in line with the grain of the wood. Something happened to the grubs: they did not build pupal chambers; also, they worked on one side of the egg galleries only. The wood under the bark is marked almost as plainly as the bark; hence the common name — engraver beetle.

freshly cut pine wood. They are likely to be very destructive following a severe ice storm and in the vicinity of wood-yards where freshly cut pine wood is stored. In size they vary from about that of the Southern pine beetle to that of a full-sized grain of wheat. They may attack any portion of the tree, including the larger branches. Although they breed rapidly under favorable conditions, usually they do not become epidemic except where there has been wide-spread damage to timber by storms or fires.

The egg galleries, although mainly in the inner bark, usually mark the wood plainly, which gives rise to the common name "Engraver beetle." They are relatively straight and have a tendency to follow the grain of the wood. The side galleries are longer and usually closer together than are those of the Southern pine beetle.

The best control is to remove lightning-struck, storm-damaged, and otherwise injured trees as quickly as possible and treat attacked trees as outlined under the Southern pine beetle.

Turpentine Beetle

No definite egg galleries.

The turpentine beetle is the largest of the three, about the size of the smaller varieties of soybean seed but causes the least damage. Although the adults will work in living pine trees, such trees usually produce enough resin to prevent the little grubs from maturing. Its favorite feeding and breeding places are fresh pine stumps and stump portions of trees killed by one of the other two beetles.

Stacking freshly cut pine wood against a living pine tree is almost certain to attract turpentine beetles. As the wood dries, they move to and usually kill the living tree. The same thing is apt to happen when one of twin or forked trees is cut and the other left standing.

The turpentine beetle does not make a definite gallery. Rather, the adult lays its eggs in a cluster and the grubs work side by side in close formation, eating out a fan-shaped cavity in the inner bark as they increase in size. The pitch tubes of the turpentine beetle are the largest and most conspicuous of all the bark beetles and are almost always within 6 feet of the ground.

It is possible to dig out both the adults and the grubs with a stout knife. Squirting a few drops of carbon bisulphide into the entrance hole, then plugging it with putty or clay, may kill those at work. However, the best control is to keep the trees healthy, never stack fresh pine wood near a living pine tree, much less against it, and never cut one of double trees. As an extra precaution, on building lots where it is necessary to cut pine trees, peel the bark from all stumps or build a small fire around them so that the bark is heated through.

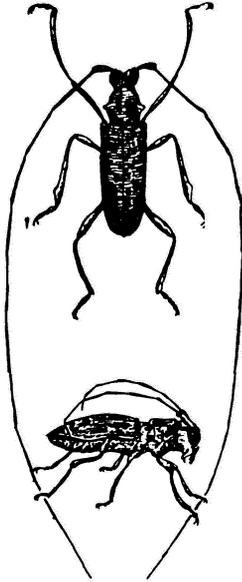
The Pine Sawyer

An insect that is frequently, but wrongly, blamed for the death of pine trees is the grub of a long-horned beetle known as the Southern pine sawyer.¹ It does not kill the tree but is a scavenger interested only in dead wood to which the bark still adheres. The adult is a greyish beetle about an inch long with antennae or feelers often two or three times as long as the body. Its eggs are laid in the dead bark and hatch into legless grubs. These work under the bark for a time but soon burrow into the wood. Their gnawing can be plainly heard. This noise has given rise to one of its common names — sawyer. Another com-

¹ Known scientifically as *Monohammus titillator*.

mon name — fish bait — comes from the use of the grubs for that purpose. When fully grown, the grubs are about 2 inches long and make a hole in the wood somewhat larger than a pencil.

The principal reason for mentioning this borer is because it is so frequently blamed for the death of pine trees. Its economic importance arises from the holes it leaves in the wood, which degrade the lumber.



The pine sawyer beetle is illustrated at the left, slightly reduced in size. The male has the long feelers or antennae; the female, the shorter ones. Her eggs hatch into the larvae or grubs that bore into the wood of cut timber or dead trees. A fully-grown grub, slightly more than actual size, is sketch below. Fishermen look under the bark of pine logs and limbs for this fellow for fish bait. The pupal or resting stage is sketched at right.



What the grubs do to pine logs is illustrated below: a, egg pit; b, entrance holes of grubs; c, pupal cell; d, emergence holes; e, f, g, h, larva mines; i, larva in proportion to borings, about half natural size.

