

Prevention strategies



Wounded crop tree



Fire scorched tree



Logs shouldn't remain in stand after June 1



Slash piled for burning



Chipping pine slash

3. Avoid wounding the live, standing pines.
 4. Move all pine logs and cut pine wood out of the stand by June 1 every year. Earlier is even better.
 5. Pine slash management:
 - a. Slash smaller than 3 inches in diameter can be left in the stand.
 - b. Slash larger than 3 inches in diameter is likely to be used by bark beetles during the upcoming growing season so it needs to be monitored for signs of bark beetles.
 - c. Slash created from March 1 to August 1 is ideal bark beetle habitat. All green, woody slash 3 inches and greater in diameter created in March, April or May needs to be removed or destroyed by June 1.
 - d. All green, woody slash 3 inches and greater in diameter created during June or July must be removed or destroyed *within 3 weeks* of being cut.
 6. Use full-tree skidding whenever possible.
 - a. If full-tree skidding is used, pile all slash and tops less than 3 inches in diameter so that they may be burned if bark beetles start to develop there.
 - b. If shortwood skidding is used, scatter the slash less than 3 inches in diameter on the site but leave a slash-free alley of 15 to 20 feet around the edge to allow burning of the slash should bark beetles develop. To aid in the rapid drying of this slash, do not lop off the branches and do not pile the slash.
- If you notice pockets of dying pines,

Danger of thinning

Thinning during the spring or summer months is very risky because thinning creates ideal conditions for bark beetles to build up on slash and then attack the remaining live pines that you want for crop trees. **If you have to harvest, thin or prune during June or July, then you should ALSO do the following activities and, even then, bark beetles could build up and attack live pines.**

1. Remove or debark all pine logs and cut pine products *within 3 weeks* of being cut.
2. During June and July, remove, debark, burn, chip or bury all green, woody pine slash 3 inches and greater in diameter *within 3 weeks* of being created.
3. Monitor for bark beetles in all the standing pines, cut products and slash. Use your knife to peel back the bark to look for signs of bark beetle activity. If they are building up, all operations should cease and cut products must be removed or debarked immediately and slash burned, chipped or removed immediately.



Thinned plantation with fresh slash is risky!



Breeding material near killed trees

please contact your local forester for advice because you may have a bark beetle population building up in your pines.

More Information

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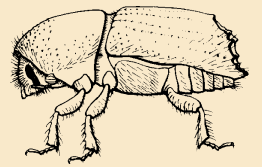
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How to identify and manage pine bark beetles



Pine bark beetles occur naturally in most conifer stands where they commonly attack and kill stressed pines. Bark beetles require freshly cut, killed or stressed pine trees or pine slash to complete their life cycle. They use this material during the spring and summer months to build up populations and then move to standing, live pines. If the weather is droughty or the trees are injured or under some other physiological stress, then bark beetles can quickly kill these trees. Bark beetles can also gain a foothold in a pine stand or plantation if the trees are struck by lightning, injured or killed by fire or die from suppression or other causes. Once bark beetles have built up, outbreaks are virtually impossible to control.



Minnesota Department of Natural Resources, Division of Forestry



Dead and dying pines



Sawdust piles near entry holes



Adult and larval galleries under bark



Adult beetle

Larvae



Exit holes in bark

● = Size of entrance and exit holes.

Bark beetles will attack standing pine trees or freshly cut pine slash and pine logs on the ground. The beetles form tunnels under the bark which interrupt the flow of water and introduce the fungi that ultimately kill the tree. In most seasons, healthy trees repel the attack by drowning the beetles with pitch, but sufficient pitch is not produced by trees when they are overcrowded or suffering from drought. Single pine trees or groups of pine trees may be attacked and killed.

Discolored foliage in the crown is often the first noticed indication of a bark beetle attack. Needle color fades from green to yellow, eventually becoming reddish brown and occurs any time from late June through the end of September. Occasionally, trees attacked and killed late in the summer remain green over the winter before turning red the next spring.

Attack often begins in the upper crown and works down the stem. The main stem and large branches should be closely examined for fine reddish-brown, sawdust-like, boring material collecting on the bark and near their entrance holes. These holes are small, 1/16 -inch wide, and are round. The holes may be difficult to find in the thick bark of the lower tree trunk. On pines with red foliage, check for the presence of bark beetle activity by removing a section of bark directly over the entrance hole. Bark beetle adults, larvae and their galleries can be found between the bark and the wood.

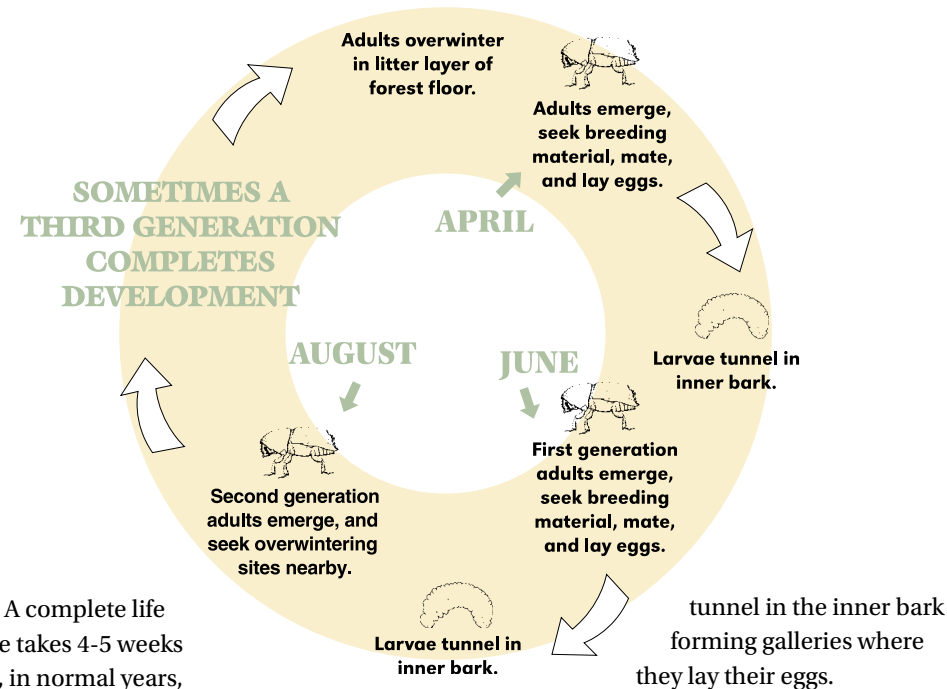
Bark beetles tunnel in the inner bark and score the surface of the wood but they do not bore into the wood. The tunnels or galleries are less than 1/16-inch wide. If beetle populations are high, galleries can coalesce and bark growing over this area becomes loose. Bark beetle larvae can be found in the galleries during the growing season. They are white, curved and legless with dark heads. When full grown, larvae are approximately 3/16-inch long and less than 1/16-inch wide. Adults are reddish brown to black in color, 3/16-inch long, rather blunt on both ends and do not have prominent antennae.

Do not confuse bark beetle activity with wood borer activity. Wood borers tunnel under the bark first, then bore down into the wood. The larvae of wood borers only infest dead or nearly dead trees and are not a threat to nearby, living pines. Their tunnels are narrow at first, but may become 1/4-inch or more wide as the larvae grow. The boring material produced by wood borers is either very coarse and contains light colored wood splinters or is very fine, sawdust-like material that is packed in the tunnels. Full-grown wood borer larvae are 1-inch or more in length, cream colored, prominently segmented and either cylindrical or flattened.



Since wood-borer eggs are laid singly in bark niches, there are no adult galleries.

Life cycle



A complete life cycle takes 4-5 weeks and, in normal years, there are 2-3 generations. Generations often overlap. Bark beetle larvae and adults are commonly found in the same tree.

The beetles overwinter as adults on the ground, under or among needles and organic litter. Adults emerge from hibernation as early as late-April then attack nearby trees and freshly cut pine logs or slash on the ground. Adults bore into the bark and

tunnel in the inner bark forming galleries where they lay their eggs. The eggs hatch in a few days and become small, legless larvae. After several weeks, the mature larvae change into pupae and finally into adults. These new adults bore out of the pine material and are attracted to freshly cut pine logs or pine slash, other stressed pines or uninfested portions of the same tree. Heavily infested logs, trees or slash or sufficiently dried pine material will not be attacked.

Bark beetles require freshly cut, killed or stressed pine trees or pine slash to complete their life cycle. They use this material during the spring and summer months to build up populations and then move to standing, live pines. If the weather is droughty or the trees are injured or under some other physiological stress, then bark beetles can quickly kill these trees. Bark beetles can also gain a foothold in a pine stand or plantation if the trees are struck by lightning, injured or killed by fire or die from suppression or other causes. Once bark beetles have built up, outbreaks are virtually impossible to control.

Outbreaks are best prevented by maintaining healthy pine trees and by avoiding the creation of bark beetle breeding material (pine slash, cut pine products or injured pine trees). Tree vigor can be maintained by planting the correct species on each site, practicing timely sanitation, avoiding overcrowding by thinning, and, by watering and fertilizing where possible. Pines killed by bark beetles during the previous growing season pose no threat to nearby living trees since they do not contain viable bark beetles and are unsuitable for breeding sites. These trees do not have to be treated or removed for bark beetle purposes.



Remove cut products by June 1

To protect nearby pines, any operation likely to create pine slash, cut pine products or injure pine trees should follow these guidelines.

1. Confine forestry, construction and road building activities to the "safe" period, the fall and winter months, when bark beetles are dormant. It is safe to start activities on August 1 and end them by March 1.
2. When droughty weather conditions are prolonged or bark beetle populations are high, there may not be a "safe" period during the year to thin or harvest pines. You may have to delay activities for a year or two.

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Slash created March 1 to August 1 is ideal habitat for bark beetles

