

# Arizona Bark Beetle Epidemics

## *Fact Sheet and Information Bulletin*

Southwestern Region, USDA Forest Service

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### **GENERAL:**

Much of Arizona continues to experience a large upswing in piñon and ponderosa pine mortality due to outbreaks of several species of *Ips* beetles and the western pine beetle. Low tree vigor caused by several years of drought and excessively dense stands of trees have combined to allow beetle populations to reach outbreak levels. These insects are native to ponderosa pine forests and piñon-juniper woodlands of the Southwest, and normally only attack a small number of diseased or weakened trees. Healthy trees are usually not susceptible to these beetles.

- In 2003, there was an increase in juniper and Arizona cypress mortality. Tree mortality is being caused by drought and native bark beetle species.
- The beetles are tiny, roughly 1/8 inch in long, or about the size of a match-head.
- These beetles have multiple generations per year, and they have a tremendous capacity to increase their populations.
- The beetles attack trees by boring through the bark and laying eggs. When the eggs hatch, the larvae feed on the soft inner bark. Also, the beetles introduce a “blue-stain” fungus that spreads and clogs the water and nutrient conducting tissues and hastens tree death. Once the insects mature, they leave the infested tree and travel to a new host. Usually, they travel only a short distance, but they are capable of moving up to ½ mile or more.
- Tens of millions of ponderosa pine and piñon trees have been killed. Overall, this equates to a loss of less than 2-3 percent of forests, although tree losses may be as high at 90 percent on some localized sites. This is the largest bark beetle epidemic ever recorded in Arizona. Many more trees are expected to die, especially if the drought persists.
- Currently, most tree mortality is centered in “stress-zones” such as drier south-facing slopes, transition areas between ponderosa pine and piñon-juniper areas, recent construction sites, and areas heavily infected with dwarf mistletoe. However, as the drought progresses, those “stress zones” are expanding into adjacent areas.
- Infested trees will start to turn reddish-brown within a month of attack. Evidence of infestation can include sawdust at the trees base or in bark crevices, small pop-corn like masses of sap (“pitch tubes”), small boring holes, and a “fading” of the needles.
- Once beetles have left a tree, it no longer poses a threat to other trees as a source of beetle infestation.

### **TREATMENT:**

- There is *nothing* that can be done to save a tree after it has been successfully attacked by bark beetles and infected with the blue-stain fungus. If the goal is to kill the beetles under the bark, then infested trees must be cut-down and treated by one of the following means:
  - o Cover logs with clear plastic in a sunny site (this produces high temperatures by a greenhouse effect), also logs can be left uncovered in a sunny site, but must be rolled weekly for even drying.
  - o Peel the bark from logs, or

- o Burn, chip, or bury the logs. (It must be noted that fresh pine chips can attract bark beetles and should not be left adjacent to standing green pines.)
- Fresh pine debris over 4-inches in diameter, created during tree thinning operations, must be removed from the forest or treated, because it can serve as a breeding site for *Ips* beetles.
- There is no effective insecticide treatment for infested trees. Injecting trees with insecticides is not an effective method of control or prevention.
- Due to the large extent of the outbreaks and the tremendous capacity of bark beetles to increase their numbers, there is no possibility of implementing effective control actions to prevent further tree losses on a landscape level.

**PROTECTING HIGH-VALUE TREES:**

- Trees not yet infested can be protected by annual applications of a preventive insecticide. Carbaryl and permethrin-based insecticides are specifically labeled for this purpose, but carbaryl is the preferred material because it provides longer protection. Typical home and garden insecticides should not be used. The entire surface of the trunk and large limbs must be sprayed all the way to within a few feet of the top.
- Watering individual trees can help increase a tree's natural defense of pitching out attacking beetles.
- Over the long run, selective removal of designated trees, coupled with brush disposal and appropriate use of prescribed fire, will not only improve forest and tree health, but also greatly reduce the probability of bark beetle outbreaks and catastrophic wildfire.

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