

Avoid Treatment Failure Due to:

Inadequate / improper coverage or treatment

- Limited spray height – pump pressure is inadequate and/or the orifice size is incorrect.
- Light coverage – insecticide is not applied to the point of runoff.
- Limited coverage – one or more bole faces, the root collar and/or large exposed root surfaces are not treated.
- Trees targeted for treatment are missed during the application.
- Treating trees that are already successfully attacked by bark beetles.

Improper mixing

- Use of improperly stored insecticide (e.g., insecticide exposed to freezing temperatures). If the insecticide is not viscous when poured from the container and flows out as lumps, it has probably been improperly stored.
- Errors in calculations resulting in reduced concentrations of the recommended active ingredient.
- Intentional use of a reduced rate of active ingredient.

Research indicates 97% of all spray deposition occurs within 50 feet of the tree bole. Near surface water a no-treatment buffer of 50 feet is generally recommended. A spray buffer of 75 feet would protect even the most sensitive aquatic insects when properly applied. To limit exposure to bees, treatments should occur early in the morning or during the fall when bee activity is low or absent.

To reduce human exposure to insecticide, personal protective equipment must be worn. A hard hat with a face shield, rubber gloves and disposable clothing are recommended (see label). Picnic tables, water faucets, etc. should be covered with plastic before the insecticide application or cleaned with detergent and water after application.



Cover facilities with plastic or wash after treatment application

This publication mentions pesticides. It does not endorse particular products, nor does it imply that the uses discussed have been registered. All pesticides must be registered in the United States by the appropriate State and/or Federal agencies.

The USDA is an equal opportunity provider and employer.

March 2011

Using Insecticides to Protect Individual Conifers from Bark Beetle Attack in the West



USDA Forest Service
Forest Health Protection
Intermountain and Northern Regions



Insecticides registered for bark beetle control are used as preventative treatments and must be applied before trees are mass attacked. No registered insecticide prevents tree mortality once a tree has been successfully infested.

Signs of successful bark beetle attacks may include pitch tubes on the bole, boring dust in bark crevices and around the base of the tree, pitch streamers with boring dust in the pitch and/or needles turning yellow to red throughout the crown. Boring dust encircling the base of the tree and fading needles are symptomatic of tree mortality. Do not treat trees if any of these symptoms are visible.



Pitch tubes and boring dust indicate successful attack by bark beetles

The most common method of protecting individual trees from bark beetle attack is to spray the tree bole with insecticides registered for this use (e.g., with carbaryl, or the pyrethroids bifenthrin or permethrin). If applied properly, carbaryl treatments generally provide two years of protection for most tree species; pyrethroid treatments generally provide one. Tree injection treatments have had limited success and are not generally recommended for protecting conifers from bark beetles. To date only one active ingredient (emamectin benzoate) has been demonstrated effective for protecting ponderosa pine from western pine beetle. Therefore, no systemic injection tool is recommended for protection of lodgepole pine or Engelmann spruce at this time.

To improve treatment success of bole sprays the following steps should be taken. . .

Prepare Trees for Treatment

- Trees should be flagged or spot painted before treatment with flagging removed or the spot repainted with a different color to indicate the tree was successfully treated.
- Trees must be checked before application to ensure no successfully attacked trees are treated.
- Trees with multiple branches on the lower bole may need to be pruned to facilitate access and ensure thorough coverage of the bole.

Properly Apply Insecticide

- Contract a licensed and insured applicator.
- Applicators must have a spill containment kit.
- Insecticide applications should be monitored.
- Only liquid flowable formulations should be used.
- All treatments must be formulated according to label directions. For carbaryl, use only the prescribed 2% active ingredient (e.g., most labels require ~4-4.5 gallons of product mixed into 100 gallons of water). Water pH should be ≤ 7 . At higher pH levels, degradation of carbaryl may occur, reducing treatment effectiveness.
- Lake or stream water used in tank mixes should be filtered to avoid clogging nozzles.
- All mixtures should be used shortly after mixing. Avoid overnight storage as this may decrease treatment effectiveness.
- Hydraulic sprayers capable of maintaining pressures of 325-450+ pounds per square inch (PSI) are necessary to reach the appropriate spray height on most trees.
- For trees ≥ 16 inches diameter breast height (dbh), a #10 or #12 nozzle (0.396-0.475 mm orifice) should be used with a sustained PSI of 400+ to reach 45-50 feet on the tree bole.
- For trees < 16 inches dbh, a #8 orifice (0.318 mm) is recommended with a sustained PSI of 325+ to reach 35-40 feet on the tree bole.
- All bole surfaces must be treated, including the root collar and exposed surface roots, to the point of runoff to ensure all bark crevices are treated with insecticide.
- Treatments should not be applied if winds exceed 10 mph; if tree boles are wet; or if rain is anticipated within the next 4 hours.
- To treat very large trees (> 25 inches dbh) in areas where outbreak bark beetle populations are occurring, higher pump pressures or a bucket truck may be required.

Technical assistance can be obtained from USDA Forest Service, Forest Health Protection entomologists (www.fs.fed.us/foresthealth/), state forest entomologists and/or county extension agents (www.csrees.usda.gov/extension/index.html).

Cover Photo: Carbaryl can be used as a preventative spray against future bark beetle attack.