



SPRAYING TREES TO PROTECT AGAINST MOUNTAIN PINE BEETLE COMMON QUESTIONS FOR LANDOWNERS TO CONSIDER



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Due to the current mountain pine beetle (MPB) epidemic in Colorado, landowners are concerned about protecting their trees. Aggressively searching out, removing, and destroying the brood in infested trees is the best way to slow the spread of MPB; however, it may not protect specific trees. Spraying trees to prevent attack is the most effective way to protect a small number of high-value trees from mountain pine beetle. Research indicates that other methods, including tree injections and pheromones, are either ineffective or less effective than spraying, especially when beetle populations are high. The following will provide additional information for landowners who are considering treatments to address MBP infestations.

How many trees should be sprayed?

Spraying is not recommended on a large scale for ecological and financial reasons. Selecting 5 to 10 high-value trees to spray is more realistic.

What trees should be sprayed?

A high-value tree is one that is important to you for a variety of reasons – perhaps it acts as a visual screen, shades a deck, or has emotional or aesthetic value. A high-value tree may not always be the biggest tree on your property. Large trees usually are more vulnerable to attack, while trees under 3 inches in diameter should be safe from attack. Only pine trees – lodgepole, limber, ponderosa and bristlecone – are susceptible to MPB, although some Engelmann and blue spruce were killed on the Western Slope when the infestation was at high levels. Before spraying, make sure the tree in question has not already been attacked by pine beetle. It also is important to remember that lodgepole pine trees are shallow-rooted, which means that surviving or protected trees may blow over if too many adjacent trees are removed because they are infested with beetles. Defending a small patch of trees may be the best option to provide protection from the wind.

How do I identify pine trees?

An easy way to identify pine trees is to look for needles that are attached in small bundles of 2-5. Needles on other tree species are attached singly.

When should I spray?

The best time to spray is close, but prior to, beetle flight in July. Spraying in May or June will yield the best results, and the chemicals are usually effective for at least one year. Be sure to call a licensed applicator in advance so you can reserve time on his/her schedule.

How many years will I need to spray?

You will need to spray every year for as long as the pine beetle epidemic lasts, which could be 10 years or more.

Who can spray?

Commercial licensed applicators are highly recommended. They have the necessary high-pressure equipment and personal protective gear, and are held to high public and environmental safety standards by the State of Colorado. If you choose to apply spray yourself, YOU MUST follow the label exactly, dispose of any leftover spray, and rinse with water according to directions. Only use insecticides that are labeled to protect trees from bark beetle attack. These insecticide formulations have additives that

bind the active ingredient to the bark. If you hire someone to spray, that person must be a licensed applicator. To verify qualifications, ask to see her/his license and request references. It also is advisable to get a commitment to spray before the beetles fly in July.

In addition, make sure that the applicator:

- Sprays from ground level to the point where the tree tapers to less than 4 inches. It may not be possible to effectively spray a really tall tree.
- Sprays around the entire circumference of the tree and does not miss areas with large branches or forks, otherwise the unsprayed “windows” are open to attack.
- Does not spray trees if there is a chance it may rain within two hours after application. Once the insecticide dries on the tree bark, it will be resistant to wash-off.
- Uses a chemical that is specifically labeled for mountain pine beetle; it needs to have the right additives to bind the active ingredient to the bark.

How much does spraying cost?

Cost depends on the number of trees sprayed. It may be more economical to coordinate with your neighbors to increase the number of trees sprayed in a single visit, as this will bring down the cost.

How do I find a Commercial Licensed Applicator?

Look for “tree service” in the phone book or on the web, and ask if they are qualified to apply sprays that prevent mountain pine beetle, or talk to neighbors who may have had their trees sprayed.

What chemicals are used for preventive spraying?

Carbaryl (Sevin SL and XLR, and others) and Permethrin (Astro, Dagnet and others) and bifenthrin (Onyx) are registered for use in the prevention of pine beetle infestations. Only use insecticide formulations that are labeled to protect trees from bark beetle attacks. These formulations include additives that bind the active ingredient to the bark. The pH of the water mixed with the insecticide should be slightly acidic to near neutral. Do not use alkaline water with carbaryl without first neutralizing the pH. It seems that carbaryl is not stable under alkaline conditions.

Toxicity/ecological effects of the chemicals (for more detailed information: <http://npic.orst.edu/>)

Carbaryl (Sevin SL, XLR, or 4L)

- Carbaryl is a wide-spectrum carbamate that is used to control more than 100 species of insects.
- Acute toxicity: moderate to very toxic.
- The EPA considers carbaryl “likely to be carcinogenic in humans” due to increased tumor production in mice.
- Breakdown in soil: half-life of 7-14 days in sandy loam soils and 14-28 days in clay loam soils. It is not a high-leaching compound, but it is prone to runoff.
- Breakdown in water: half-life of about 10 days at neutral pH, but can vary depending on acidity in water; in river water, exposed to natural and artificial light, it degrades completely within 2 weeks.
- Fate in humans and animals: rapidly broken down, excreted in urine and feces at a rate of approximately 75 percent with initial exposure.
- Effects on birds: practically non-toxic to wild bird species.
- Effects on aquatic organisms: moderately toxic to highly toxic to aquatic species such as rainbow trout.
- Effects on other insects: lethal to many non-target species, including bees and other beneficial insects.

Permethrin (Astro or Dragnet)

- Permethrin is a broad spectrum synthetic pyrethroid insecticide.
- Acute toxicity: moderate to practically non-toxic via the oral route. Via the dermal route, slightly toxic
- Breakdown in soil: half-life of 30-38 days. Permethrin is tightly bound by soils, so little to no leaching occurs in groundwater.
- Breakdown in water: half-life of less than 2.5 days. Permethrin degrades rapidly in water, although it can persist in sediments.
- Fate in humans and animals: efficiently metabolized by mammalian livers. Quickly excreted with no significant persistence in body tissues.
- Effects on birds: practically non-toxic to birds.
- Effects on aquatic organisms: aquatic ecosystems are very vulnerable to the impact of permethrin.
- Effects on other organisms: permethrin is extremely toxic to bees and other beneficial insects if present during application, or within 24 hours thereafter.

Bifenthrin (Onyx)

- Bifenthrin is a member of the pyrethroid chemical class..
- Acute toxicity: moderately toxic to mammals when ingested.
- Breakdown in soil: bifenthrin does not move in soils with large amounts of organic matter, clay or silt, and has low mobility in sandy soils that are low in organic matter. Its half-life in soil is 7 days to 8 months depending on the soil type and the amount of air in the soil.
- Breakdown in water: relatively insoluble in water, so there are no concerns about groundwater contamination through leaching.
- Effects on birds: moderately toxic to many species of birds and is slightly more toxic than permethrin.
- Effects on aquatic organisms: aquatic ecosystems are very vulnerable to the impacts of bifenthrin.
- Effects on other organisms: bifenthrin is extremely toxic to bees and other beneficial insects if present during application, or within 24 hours thereafter.

On-line versions of the labels for these pesticides can be found: <http://oaspub.epa.gov/pestlabl/ppls.home>

I heard that carbaryl was found in the Blue River after preventative spraying occurred. Will spraying contaminate our groundwater?

Carbaryl was found in water, but not in the Blue River. It was detected in the surface water from the waste water treatment stream, which suggests misapplication or improper disposal of the pesticide. Again, it is imperative to apply all insecticide mix and rinse water to trees according to label directions. Do not wash equipment or dispose of left-over insecticide mix or rinse water into a waster water system. Do not draw water from a water source (pond or creek) into a mixing tank. Maintain a separate water supply and delivery system to prevent contaminating fresh water with mixed insecticide.

Because carbaryl is not a high-leaching compound, but is more prone to runoff, it is more likely to be found in surface water than in groundwater (wells). So far, it has been found in the surface water once, and again, it is probably due to improper disposal. None of the Colorado State University well-sampling programs have detected carbaryl in groundwater in Colorado.

For more information about preventive spraying, contact Colorado State Forest Service entomologist, at 970-491-6303.

For more information about health effects that could be related to the use of these pesticides, please contact the Colorado Cooperative Program for Environmental Health Assessments (CCPEHA) of the Colorado Department of Public Health and Environment (CDPHE) toll free at 1 (888) 569-1831, extension 2617.