Spraying Trees To Protect Against Mountain Pine Beetle
Common questions and things for landowners to consider

Prepared by Irene Shonle, CSU Extension and Ingrid Aguayo, CSFS Entomologist

With the mountain pine beetle epidemic, 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 on a piece of property. However, this will not necessarily protect specific trees. Spraying trees to prevent bark beetle attack is the most effective way to protect a small number of high value trees from mountain pine beetle. Other methods (tree injections, pheromones) have been shown to either be ineffective or not as effective (especially when beetle populations are high). This 'thought sheet' is meant to provide some additional information for landowners.

How many trees?

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 to spray?

A high value tree is one that is important to you – this could be because it acts as a visual screen, shades a deck, has emotional or aesthetic value. It may not be the biggest tree on your property. Large trees are usually more vulnerable to attack, while trees less than 3" diameter should be safe from attack. Only pine trees (lodgepole, limber, ponderosa and bristlecone) are susceptible (although some Engelmann and blue spruce were killed on the Western slope when the pressure was high). Make sure the tree in question has not already been attacked by pine beetle. Another factor to consider is that lodgepole pine trees are shallow-rooted and that surviving (or protected) trees may blow over if too many adjacent trees are removed because they have become infested with beetles. Protecting a small patch of trees may be best for protection from the wind.

How do I identify pine trees?

An easy way to identify pine trees is that the needles are attached in little bundles of 2-5. Needles from other tree species are attached singly.

When to spray?

The best time to spray is close to, but still before beetle flight in July. Spraying in May or June will give best results (although you will probably have to call to schedule in advance). The chemicals are usually effective for at least one year.

How many years to spray?

You will have to spray every year for as long as the pine beetle epidemic lasts (this could be 10 years or more).

Who can spray?

Commercial Licensed Applicators are highly recommended, rather than doing it yourself. They have the high-pressure equipment, the personal protective gear, and are held to high public and environmental safety standards by the State. If you choose to spray yourself, YOU MUST follow the label exactly, and dispose of the leftover spray and rinse water according to directions. Use only insecticides that are labeled for use 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, they must be a licensed applicator. Make sure to ask to see their license, and request references. Also make sure to get a commitment that they will spray before July.

Make sure that the applicator:

- Sprays from ground level to the point where the tree tapers to less than 4". A really tall tree may not be possible to spray effectively.
- Sprays around the entire circumference of the tree, not missing areas with large branches or forks – otherwise the unsprayed "windows" are open to attack.
- Does not spray trees if there is a chance of rain within two hours. 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 it cost?

It depends on number of trees sprayed - it may be best to coordinate with your neighbors to increase the number of trees sprayed in a single visit, as this will bring the charge down.

How do I find an applicator?

Look for "tree service" in the phone book or web, and ask if they preventatively spray for mountain pine beetle, or talk to neighbors who may have had their trees sprayed.

What chemicals are used for preventative spraying?

Carbaryl (Sevin SL and XLR and others) and Permethrin (Astro, Dragnet and others) and bifenthrin (Onyx) are registered for use for preventatively spraying for pine beetle. Use only formulations of insecticides that are labeled for use to protect trees from bark beetle attack. These formulations have additives that bind the active ingredient to the bark. Water pH should be slightly acid to near neutral. Do not use alkaline water with carbaryl without first neutralizing the pH.

Toxicity/Ecological effects of the chemicals (For more detailed information**:** http://npic.orst.edu/)

Carbaryl (Sevin SL or XLR)

- Carbaryl is a wide spectrum carbamate controlling over 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. 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 @ approximately 75% 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)

- 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 making for little to no leaching to 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 and silt and has a 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 impact 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.

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

Carbaryl was found, but not in the Blue River. The detections were in the surface water from the waste water treatment stream, which suggests misapplication or improper disposal of the pesticide. Again, 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 draft 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 only been found in the surface water once (and again, it is probably due to improper disposal). Carbaryl has not been detected in groundwater in Colorado in any of the CSU well sampling programs.

For more information, contact:
Ingrid Aguayo (Colorado State Forest Service Entomologist) 970-491-7282

Revised 07/08