



## Insecticides for Protecting Pine Trees from Mountain Pine Beetle

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Pesticide treatments are an effective means of protecting a small number, usually 20 or fewer, pine trees from mountain pine beetle. If there is mountain pine beetle activity within several miles of a property, protecting valuable trees from attack may be necessary. Generally it is more effective for homeowners to hire a commercial applicator with the experience and equipment to properly treat and protect the trees. While there are insecticides labeled for bark beetle control that may be applied by tree owners, we recommend that commercial licensed applicators be hired.

### What to check for when hiring an applicator

First, make sure that the applicator has the appropriate licenses to apply pesticides in South Dakota. Commercial applicators applying insecticides on trees surrounding homes and in lawns or maintained groundcover must be licensed in Category 4: Turf and Ornamentals. If the applicator is applying insecticides in forest stands, they must be licensed in Category 3: Forestry. In addition to checking for the appropriate licenses it is also a good idea to request references and also get a commitment to apply the treatment before the end of June.

### What insecticides can be used to protect trees from mountain pine beetle?

The insecticides are sprayed on the trunk to kill the beetles as they land on the tree. The insecticides that are commonly used and labeled for bark beetle control have Bifenthrin, Carbaryl or Permethrin as their active ingredient. There are products containing these active ingredients that are restricted to commercial applicators as well as many products that are general use and may be applied by tree owners on their property. Regardless, the insecticide used *must be specifically labeled for bark beetle control* as there are products containing these active ingredients that are not labeled for bark beetles and will be ineffective. Insecticides containing any of these three activity ingredients Bifenthrin, Carbaryl and Permethrin can be used to protect trees in an ornamental setting, for example trees in a lawn area near a residence usually less than an acre in size. Only Carbaryl can be used to protect trees that are in forest stands, insecticides containing Bifenthrin and Permethrin are not labeled for use in forests.

**Bifenthrin** is the active ingredient found in Baseline, Bifen XTS and Onyx. Bifenthrin has low to moderately toxicity to many bird species, but is highly toxic to most aquatic species. It is also highly toxic to bees and other beneficial insects. Only a limited number of trees can be treated with Bifenthrin before label rates are exceeded, this is typically between 10 to 20 trees per acre.

**Carbaryl** is the active ingredient found in Carbaryl 4L, Sevin XLR Plus and Sevin 4L. Carbaryl has low toxicity to birds, but is highly toxic to many aquatic species and non-target insects such as bees. Carbaryl is quickly degraded in alkaline water so water used in sprays must be neutralized. There are buffers sold to correct the pH of the water.

**Permethrin** is the active ingredient found in Astro and Tenugard SFR. Permethrin is highly toxic to fish and aquatic invertebrates as well as bees and other beneficial insects. Permethrin has low toxicity to birds and mammals but is toxic to cats. Only a limited number of trees can be treated with Permethrin before label rates are exceeded, this is typically between 10 to 20 trees per acre.

There are insecticides such as Dinotefuran sold as Safari and Imidacloprid sold as Marathon that are applied either as basal trunk or soil drenches. These products are designed to be absorbed into the tree and kill the beetles as they burrow into the trunk. They have not been tested on mountain pine beetle and their effectiveness is unknown.

## **When to treat**

The insecticides currently available are only effective for preventing a successful attack by the mountain pine beetle so they must be applied before the beetles begin to fly in the summer and seek new hosts. We recommend that the application be applied between early May and mid-June. This is sufficiently early enough to ensure that the insecticide will be protecting the tree before the season's beetle flight begins. The application will only be effective for one growing season so trees that are in an area with mountain pine beetle activity must be treated every year to continue protection. Protection from pine engraver beetles (*Ips pini*), another bark beetle that may attack branches and tops of trees, requires the spray to be applied in early April as this insect begins flying sooner than mountain pine beetle. If applied properly the insecticide will still be effective at killing mountain pine beetles later that same summer.

## **How the spray should be applied**

The bark of the trunk must be treated so that is thoroughly wetted with the insecticide to the point of runoff, merely misting the trunk will not allow for penetration of the chemicals into the bark fissures and cracks. The insecticide should be applied completely around the trunk from the base to a point where the trunk tapers to a diameter of 4 or 5 inches for mountain pine beetle and the entire trees for protection from pine engraver beetle. Homeowners attempting to treat their own trees should be sure that their sprayer has sufficient pressure to wet the upper trunk of their trees. A hydraulic sprayer with at least 250 psi is needed for small trees, those that are less than 25 feet tall, while 400 psi or more is required to treat tall trees, those over 50 feet. All trees to be protected from mountain pine beetles must be treated. Merely spraying trees surrounding a property as a buffer will not prevent the beetles from attacking interior trees.

## **Products not proven to be effective against mountain pine beetles**

There are also products sold for mountain pine beetle control that are either microbial sprays or fertilizers. The microbial sprays are designed to either kill the beetles as they feed in the tree or kill the bluestain fungi that the beetles introduce into the tree. There are no scientific studies at this time that demonstrate any effectiveness for these products. Fertilizers and products containing colloidal chitosan such as AgriHouse Organic Disease Control will also not protect a tree from attack by the mountain pine beetle nor allow the tree to survive an attack. While some of these products claim to increase the pitch production in treated pines, this has not been shown to prevent or reduce successful attacks. The only proven methods of protecting pines from becoming infested with mountain pine beetle is trunk sprays with insecticides containing Bifenthrin, Carbaryl or Permethrin.

## **IMPORTANT CONSIDERATIONS**

Homeowners considering treating their own trees are cautioned to use the proper equipment and only apply pesticides that are labeled for use for this purpose. Applications must not exceed labeled rates. Homeowners should read and follow all precautions and safety recommendations provided on the pesticide container label. Homeowners may not treat trees that are not on their property unless they are a certified commercial applicator. Contact the South Dakota Department of Agriculture Division of Agricultural Services for more information. Any treatment recommendations, including those identifying specific pesticides, are for the convenience of the reader. Pesticides mentioned in this publication are generally those that are most commonly available to the public in South Dakota and the inclusion of a product shall not be taken as an endorsement or the exclusion a criticism regarding effectiveness. Please read and follow all label instructions and the label is the final authority for a product's use on a particular pest or plant. It is the reader's responsibility to determine if they can legally apply any product identified in this publication.

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