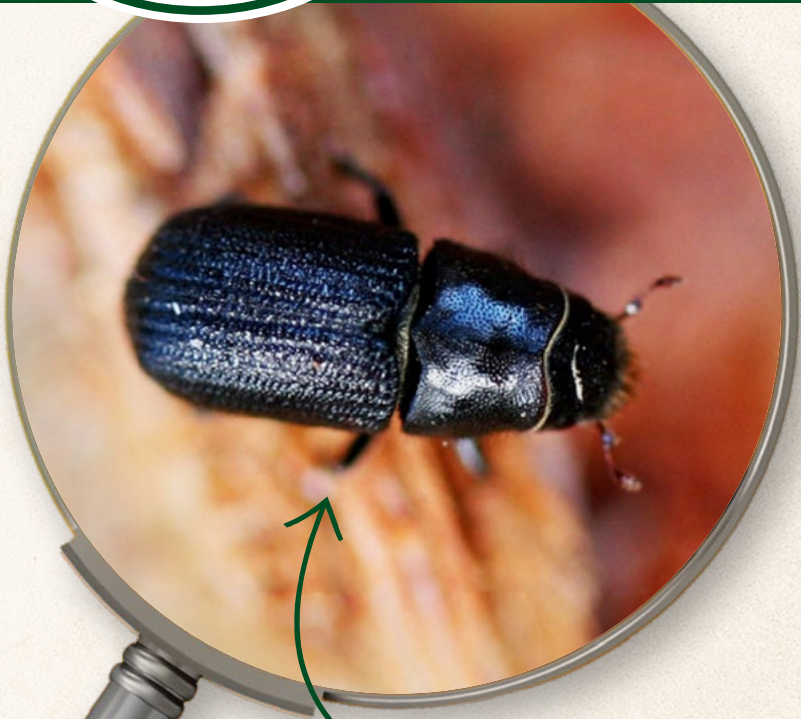




Verbenone Pheromone Packets

FAQs about protecting pine trees from mountain pine beetle



Mountain pine beetle, actual size 3.5–6.8 mm.
Photo: CSFS

What is Verbenone?

In nature, bark beetles communicate with pheromone scents called semiochemicals. Verbenone is an anti-aggregation pheromone produced by mountain pine beetle (*Dendroctonus ponderosae*) to indicate a tree has reached maximum capacity and there are no resources available for other beetles. Verbenone has been synthesized into small packets that can be attached to all varieties of pine trees as a sort of “No Vacancy” sign to prevent new infestations. Verbenone works by affecting beetle behavior, making it an environmentally safe alternative for tree protection.



Verbenone pheromone packets: Bubble (left) & Pouch (right).
Photo: Abbey Bowser, CSFS

Verbenone is packaged in a semipermeable plastic that releases the product into the environment over time to create a “pheromone plume” around your property. Verbenone packets are sold in a few different forms (Bubbles and Pouches), which vary in cost and application to maximize effectiveness and help individualize protection strategy depending on the acreage, number of trees and specific landowner goals.

How do I know if my tree is infested with mountain pine beetle?

Pitch tubes

Infested trees usually have several popcorn-shaped masses of resin around the trunk where beetles have tunneled into the bark. However, pitch tubes may not be present in years with below average precipitation.

Pitch tubes on a lodgepole pine (left). Beetle being pitched out of a ponderosa (right). ▶



Boring dust

Often, boring dust can be seen on the ground at the base of the tree, in bark crevices, and around the pitch tubes (if present).

◀ Boring dust accumulating at the base of a tree. Photo: Abbey Bowser, CSFS

Fading needles

Following a successful attack, pine needles will turn yellowish to reddish in color. The needles will begin to fall from the branches the second summer after attack.

Group of pine trees fading following successful mountain pine beetle attack. ▶
Photo: Dan West, CSFS



Woodpecker damage

Woodpeckers will often search for beetle larvae in infested trees, stripping the bark off the tree and leaving behind large holes.

◀ Infested tree that has been stripped of its bark by woodpeckers.
Photo: Dan West, CSFS

FOR ASSISTANCE IDENTIFYING POTENTIAL BEETLE INFESTATIONS, CONTACT YOUR LOCAL CSFS FIELD OFFICE.

Is Verbenone the right treatment for my trees?

Most *Dendroctonus* beetles typically disperse within ½ -1½ miles from their source tree. However, once a tree becomes infested, nearby trees are at an elevated risk of subsequent attack. If you notice infested trees near your property, Verbenone application is recommended, especially in years with low precipitation. The map found on the [Colorado State Forest Service's Insect and Disease page](#) can help determine if mountain pine beetle activity has previously been detected in your area.

Verbenone is only effective for use on pine trees, not for other conifers! Identifying the pines on your property is important for Verbenone application. Treatments differ for protecting other tree species from bark beetles.

• Quick tips for identifying pine trees •

Pine trees have needles that are connected to the twig in groups (usually 2,3 or 5) within a fascicle. Other conifer needles are attached individually to the twig. Cones can also be used to differentiate pines from other conifers, where pine cones are usually large, round, and woody.

• PONDEROSA PINE •



Fascicle with needles growing in clusters of two or three

Is this a pine? YES!

Pine species in Colorado: Ponderosa, lodgepole, limber and bristlecone.

Large, round cone



Photos: Abbey Bowser CSFS

• DOUGLAS-FIR •



Needles growing individually

Is this a pine? NO!

Other conifers in Colorado: Douglas-fir, Engelmann spruce, Colorado blue spruce and sub-alpine fir.

Long, scaly cone with bracts



Photos: Zach Smith, CSFS



Verbenone bubble stapled to the north-facing side of the tree, bubble side down.
Photo: Abbey Bowser, CSFS

How do I apply Verbenone?

- Although Verbenone is not toxic, the manufacturer recommends wearing gloves when handling this product.
- Verbenone packets should be stapled to trees using a heavy-duty staple gun. Take care not to puncture the reservoir of product, stapling only the top plastic layer. Verbenone bubbles should be stapled with the bubble facing down.
- Staple packets about 6 feet above the ground, or as high as you can safely reach, on the north-facing side of the tree.
- **The application for pouches & bubbles is different!** Bubbles contain less product (0.98 grams), and should be placed on smaller trees and/or interspersed in dense stands. Pouches contain higher concentrations of Verbenone (5.88 - 7.84 grams) and should be applied to the largest, most valuable trees on your property.
- To maximize their effectiveness, packets should be placed in a **grid pattern**, no more than 12 feet apart. The pheromone plume emanating from the Verbenone packets will provide protection to any trees that fall inside this 12-foot radius. However, more susceptible or valuable trees should still be treated with Verbenone, even if a nearby tree has already been treated.



Verbenone Bubble

- 0.98 grams
- Interspersed between pouches and in dense pine stands

Verbenone Pouches

- 5.88 - 7.84 grams
- Placed on large diameter trees around the home and major viewsheds



Grid placement

The diagram below provides an overhead view of how to apply Verbenone to maximize the efficacy of the product. Pouches were placed first, prioritizing the largest trees around the house. Bubbles were dispersed in areas that fall between the effective radius of the pouches, on smaller trees and in denser stands around the property boundary. This Verbenone treatment plan uses 32 pouches and 47 bubbles.

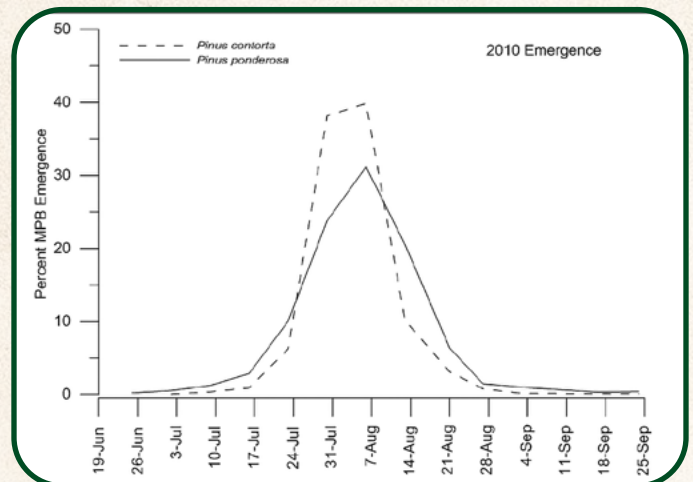


Verbenone treatment plan that uses a combination of Pouches and Bubbles. Photo: Dan West, CSFS

P = Pouch **B** = Bubble

When should I apply Verbenone to my trees?

Verbenone should be deployed no later than mid-June, before the projected mountain pine beetle flight begins. Verbenone packets will protect your trees for approximately 90 days, which will provide protection while adult beetles are flying to new trees. However, annual precipitation and temperature variations may slightly affect the timing of beetle emergence. Only one application is needed each year.



Mountain pine beetle emergence dates recorded in 2010. Graph: Dan West, CSFS



Verbenone packets in a residential community near Gunnison. Photo: Abbey Bowser, CSFS

Can I save my tree after it has been infested?

Unfortunately, Verbenone is only effective when used preventatively. Once a tree is mass-attacked, there is little that can be done to save the tree. Verbenone should be placed on surrounding trees, **but removing any infested trees or slash should be prioritized.**

How much Verbenone do I need?

The amount of Verbenone needed depends on the size of the property, number of pine trees and specific landowner goals. Some landowners choose a stand-level protection strategy. Others opt for a more cost-effective treatment by prioritizing their most valuable trees.

How effective is Verbenone?

When used preventatively in low-level or initial stages of infestations, Verbenone can be an effective tool to protect your trees. However, as beetle populations increase, Verbenone effectiveness wanes and may not fully protect trees because of the large number of beetles present in the environment. Other synergistic compounds are being developed and are available for experimental use. During years of below average precipitation, trees are significantly more susceptible to beetle attack, and Verbenone is critical for protecting trees.

• USEFUL TIPS •

- Remember: Verbenone is only effective at protecting pine trees!
- Verbenone should be applied before beetles begin to emerge.
- Place Verbenone packets in a grid pattern, no more than 12 feet apart.
- Packets should be stapled on the north-facing side of the tree, as high as you can safely reach.
- Unused packets can be placed in an airtight container in the freezer for use the next year.



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