

VERBENONE POUCH FOR MOUNTAIN PINE BEETLE

TREATMENT OF INDIVIDUAL TREES AND SMALL GROUPS OF TREES

Research has demonstrated that pine trees baited with aggregation pheromones can be protected from attack by the MPB with a single verbenone pouch. However protection is not absolute. If treatment of trees with a chemical insecticide spray is not acceptable, we recommend treating individual trees with two pouches, one at 1-1.5 m above ground and the second at about 2.5 m. We also recommend placing pouches at 4-5 m intervals on vertical objects within 5 m of the tree to be protected. Similar treatments can be applied on small groups of trees, e.g. 2-10 trees, with each tree receiving one or two pouches, and also deploying a similar ring of surrounding pouches.

Often pines on small rural lots, up to 10 ha in area, are threatened by MPB infestations from surrounding forests. These can be treated with a grid of verbenone pouches, just like forest stands (see above).

TREATMENT OF RURAL SETTLEMENTS AND RECREATIONAL SITES

The enjoyment of rural settlements and recreational sites, e.g. golf courses, resorts and campsites, is often greatly enhanced by the presence of mature pines that provide both greenery and shade. Both can be lost due to infestation by the MPB. Research suggests that verbenone pouches can be used effectively to protect trees from attack in these rural settings.

It is strongly recommended that verbenone pouches be employed as part of a comprehensive IPM plan in such sites. Because each site is unique, and may present a unique challenge, these plans are best devised and implemented by a qualified forest health professional. Contact Phero Tech Inc. for recommendations.

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PRODUCT PROFILE

The Verbenone Pouch is a novel pheromone product designed to prevent attack by the mountain pine beetle, *Dendroctonus ponderosae* (MPB), on any species of pine.



The product contains verbenone, 4,6,6-trimethylbicyclo(3.1.1)hept-3-en-2-one, an antiaggregation pheromone used by the MPB in nature to terminate attack on trees that are full of beetles. Verbenone acts as a "NO VACANCY" sign to MPB.

Footnote: A similar product, the MCH bubble cap, can be used to protect Douglas-fir trees from attack by the Douglas-fir Beetle, *Dendroctonus ponderosae* (DFB). If you have a problem with the DFB, or with both species of bark beetle, please contact us or visit our website (www.pherotech.com) to learn more.

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INTRODUCTION

Verbenone is primarily produced by microorganisms associated with MPB galleries in newly mass-attacked trees. At first, beetles are attracted to trees by aggregation pheromones produced by attacking beetles. This induces a synchronized mass-attack that is necessary to kill the tree. Verbenone acts in opposition to the aggregation pheromones to regulate attack density so that each pair of beetles has sufficient bark in which to rear their brood. When a tree is full, enough verbenone is produced to force host-seeking beetles to direct their attack toward adjacent trees. This creates patches of dead trees that are characteristic of early MPB infestations. MPBs have one generation per year, and attack occurs in mid to late summer. Depending on geographic location and elevation, verbenone may be produced in nature from early July to late September.



Adult Mountain Pine Beetle. Actual size: 5 mm (3/16 inch)

USE IN INFESTED STANDS

Although verbenone can be used alone, research has shown that it is best used as a component of an integrated pest management (IPM) program. Treatment is most effective in stands with light to moderate infestation (no more than 25% of trees infested, and preferably much less). The following steps are recommended, under the supervision of a forest health professional.

1. Verify that the pest in question is MPB. Examine and identify beetles and their galleries. Other bark beetle species which kill pine trees may be easily confused with the MPB.
2. Conduct a ground survey to delineate the extent of the infestation, both within and outside of the stand designated for treatment.

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USE IN INFESTED STANDS CONT'D

3. Locate, fell and remove all infested trees in the stand by the end of May. If it is impossible to remove trees, e.g. in remote stands, the infested trees may be felled and burned. This tactic is almost never completely effective in removing all of the beetles, nor does it eliminate the possibility of immigration of beetles into a stand. The effectiveness of verbenone pouches will be greatly reduced if it is not possible to remove the infested trees, e.g. in a park or protected area

4. Two to three weeks before first emergence and flight of the MPB (usually mid June to mid July), deploy verbenone pouches in a grid throughout the infested area at 10-15 m centers. Staple one pouch at maximum reach from the ground on the closest vertical object to each grid point. Make sure that pouches are on the north face of the object to minimize direct exposure to the sun. It is not necessary that the vertical object be a pine tree. This is because the objective is to lay down a "blanket" of verbenone so that any beetles remaining in the treated stand are induced to leave, and incoming beetles will not enter or land in the treated area.

5. If possible, employ aggregation pheromones to pull beetles away from the treated area at the same time that the verbenone is pushing them out of the treated stand. This can be done using Phero Tech MPB aggregation pheromone lures in 12-unit Lindgren multiple-funnel traps, or using Phero Tech tree baits. Groups of three baited traps set 2 m apart in a triangle are recommended. Because of the risk of spillover attacks, do not use traps unless they can be placed at least 50 m away from the nearest living pine trees. If baited trees are used, baits can be placed on the north face of mature pines at 25-50 m centers in stands surrounding or adjacent to the treated area.

6. After the MPB flight is over (usually by the end of September) repeat the entire process. Two or more years of treatment may be required.

MPB attacks may be greatly reduced or even eliminated for a period of time if the infestation is light and treatment is timely. It is also possible that infestations outside of the treated stand may build up to a level at which the treated area is overwhelmed with beetles, and is lost. Because the MPB attacks mainly mature stands that have a limited lifetime, treatment with verbenone is not a permanent solution. Therefore, plans should be made for eventual harvest and regeneration of mature stands. In parks and protected areas, where harvesting is not possible, other stand renewal measures, e.g. use of fire, should be considered.