Forest Insect & Disease Leaflet
Mountain Pine Beetle

Mountain pine beetle: The mountain pine beetle, *Dendroctonus ponderosae* Hopkins, is the most destructive bark beetle pest of pine forests in the western United States. This bark beetle attacks and kills lodgepole, ponderosa, limber, bristlecone, pinyon and several other species of pine. The mountain pine beetle generally attacks pine trees greater than or equal to 6 inches in diameter when measured at about 4.5 feet from the ground. It also may attack Engelmann spruce, grand fir and incense cedar. Attacks on these species are rare.

Stand of ponderosa pine. Yellow and red trees killed by MPB.

How does the beetle damage a tree? When it finds a suitable host tree, the adult beetle chews through the outer bark into phloem tissue. Phloem transports nurtrients troughtut the tree. once inside phloem, the beetle carves out a gallery and lays its eggs. After eggs hatch, larvae feed,l creating new galleries, further destroying tissue. Distruction of the phloem prevents nutrients from flowing throught the tree. During the inital construction of the egg gallery, the bark beetle often introduces a fungus that invades the sapwood of the tree. the fungus causes a bluish stain in wood called bue-stain fungus. It plugs up water-conducting vessels, preventing water transport throughout the tree.l Destruction of the phloem in conjunction with the fungus causes tree death.

Mountain pine beetle galleries with larvae

Life cycle of the mountain pine beetle: The beetle passes through the egg, larvae, pupae and adult stages during a life cycle. All stages are spent under the bark, except during the brief period when the adults fly to find a new host tree. Usually the beetle completes its life cycle in one year. Adult emergence is partially related to temperature and usually begins in mid-July.

Pitch tubes on ponderosa pine

How to tell if a tree is infested: A tree's best defense is its sap or pitch. When the beetle chews through the bark, the tree oozes pitch into the wound. Clumps of pitch or pitch tubes may generally be seen on the lower 15 feet of the tree trunk. Pitch tubes range in color from cream to red. The red tint is the boring dust of the bark and indicates a successful bark beetle attack. Successful attacks produce pitch tubes about one-half inch in size and dark-pinkish to red in color. Unsuccessful attacks producepitch clumps about three-quarter to one inch in size and

cream colored or light pink in color. Another sign of a successful attack is reddish boring dust in bark crevices and near the base of the tree. Needles on trees killed by the beetle generally turn yellow to red within one year of attack.

Control: Several options are available to control the mountain pine beetle. Control options available for managing the mountain pine beetle depend somewhat on the size of the beetle population, the age of the stand, the size of the trees and the condition of the site.

In the long term: Silvicultural control measures implemented before an outbreak (large beetle population) are the most effective and efficient in the long term. Thinning to reduce stand density will relieve competition between the remaining trees for water, light and nutrients, increasing tree vigor and reducing tree susceptibility to bark beetle attack. Develop a vegetation management plan which reduces tree density and promotes a variety of tree species, ages, and size classes. Management is best done over a large landscape, however, smaller holdings can be combined to create a larger area of management. With proper planning and cooperation between landowners, silvicultural controls are an effective and viable option. For assistance developing a management plan contact the Utah Division of Forestry, Fire and State Lands.

In the short term: Once a tree is heavily infested, where attacks exceed ¾ of the circumference of the tree, it can not be saved. Trees that are not infested, very lightly infested, or attacked on only one side of the tree (strip attack) may be sprayed with insecticide as an individual tree protection against infestation or reinfestation (trees that are lightly infested or strip attacked may or may not be saved by protective sprays). Carbaryl* emulsifiable concentrate formulations registered for use against mountain pine beetle are effective prevaentative treatments. Use a solution with a concentration of 2% active ingredient (Carbaryl) and spray all sides and surfaces of the tree trunk, including the root collar and up to at least 40 feet on large diameter trees and at least 30 feet high on all moderate diameter trees or to where the trunk narrows to 6 inches diameter. If part of the trunk is missed, that part remains vulnerable to attack. Preventative treatments completed as per label directions for bark beetles, are usually effective for 16 to 18 months. For large trees these insecticides are most effective when sprayed with a high-pressure ground sprayer capable of maintaining 350 to 450 psi (through the pull) and equiped with a # 8 or #10 orifice nozzle. Treatments in Utah should be completed by the end of June. Treatments may be repeated until insect outbreak passes. After the outbreak has passed continued protective sprays may not be needed and are damaging to natural controls, which generally keep bark beetle populations in check. Beetle populations may vary from year to year. Therefore, an area may not have continuing large populations that pose a threat. If there are currently beetles in the area, then your trees may be at risk.

Removing currently infested trees may reduce the risk to uninfested standing trees. Infested trees should be chipped, peeled, burned or moved to another site at least one mile away from other pine host trees. Burning should completely remove the outer bark to ensure all life stages of the insect are destroyed. If burning is used as a treatment, it should be used with caution to prevent wildfires.

Other treatments include; cutting all branches or sections larger than 6 inches in diameter into 12-inch lengths. Scatter them in the sun to dry. Roll the infested sections weekly one-quarter turn to expose all infested surfaces to the sun throughout the summer months. If rolling them is not practical, the wood can be split and layed bark up in full sun. This procedure promotes inner bark drying which reduces the insect's ability to develop. Infested wood to be used as firewood should be burned before the adult beetles emerge the following July. Or pile the wood in full sunlight and completely cover with 10 ml **clear** plastic in a tent like fashion. Ensure there are no tears in the plastic or gaps along the seams of the plastic sheets, and seal the plastic around the base with dirt. This practice will help prevent exiting beetles in the wood from infesting surrounding host trees. Keep woody debris to a minimum in forested sites to reduce fire hazard.

*Mention of products or companies by name does not constitute endorsement by the Division of Forestry, Fire and State Lands, nor does it imply approval of a product to the exclusion of others that may also be suitable

Always use EXTREME CAUTION when applying pesticides/insecticides. Follow instructions and safety recommendations.

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