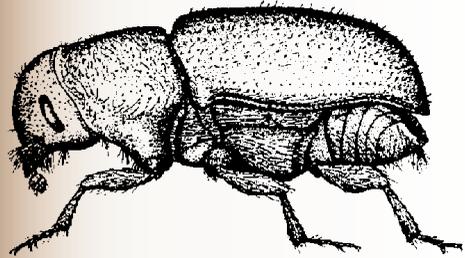




United States Department of Agriculture
Forest Service
Intermountain Region

Mountain Pine Beetle in the Intermountain West



A "group" of mountain pine beetle killed-trees may number from a few to thousands.

Introduction

The most important native bark beetle pest of mature pines in the Western United States is the mountain pine beetle, *Dendroctonus ponderosae* Hopkins. These beetles infest and kill their hosts: lodge-pole, ponderosa, whitebark and western white pines, throughout their range in the Intermountain West. Douglas-fir, true firs, spruce, larch and cedar may be attacked during beetle outbreaks, but brood development is rare. Epidemics can build rapidly and kill hundreds to millions of mature trees each year.

Description

The mountain pine beetle goes through four distinct life stages: egg, larva, pupa and adult. Eggs are oval, pearly white, and about the size of the head of a pin. Larvae are yellowish-white, legless grubs with a red-brown head capsule. Larvae undergo four size changes (instars) as they mature. Pupae are white and more closely resemble adults. Immature adults (callow adults) are tan colored, but darken to nearly black before emergence. Adults are cylindrically shaped, about one-fourth inch long, and can fly.

Life History and Habits

The mountain pine beetle has one generation per year and typically takes one year to complete its life cycle. Most over winter as larvae. Adults emerge from their host tree and infest susceptible trees

during July and August. The beetle flight period is weather-dependant and may be lengthened or shortened by abnormally high or low temperatures, respectively.

The female beetle initiates attacks. Once the female attracts a male and mates, she constructs a vertical egg gallery beneath the tree's bark, paralleling the grain of the wood.



Mountain pine beetle galleries.

Egg galleries can be up to 48 inches long and are packed with boring dust and frass. Eggs are laid in niches along both sides of the gallery and hatch within two weeks.

Larvae begin feeding at right angles to the egg gallery, first within the inner bark (phloem). By the following June, they mature and begin to feed more deeply into the bark. There they construct pupal chambers, pupate, and complete their development by mid- to late- summer. Newly matured adults chew exit holes, make new attacks, and renew the yearly cycle.

Evidence of Infestation

Examination of infested trees usually reveals the presence of pitch tubes on the lower 15 feet of the trunk. Pitch tubes are made when female beetles bore into the tree. Healthier trees which are attacked may "pitch out" beetles, resulting in unsuccessful attacks. Removing outer bark to reveal successful galleries and/or developing broods are the surest way to confirm successful attacks.

Besides having pitch tubes, trees that have been successfully infested will have dry boring dust, similar to fine sawdust, in bark crevices and around the base.

Usually, the spring after a tree has been successfully attacked, it begins to "fade." Foliage typically turns yellowish, then reddish-orange, and finally reddish-brown. After two or three years most needles have fallen from the dead tree. Fading is weather dependent, and also somewhat dependent upon individual tree's characteristics. Generally, fading is not readily apparent until the spring following an attack.



Pitch tubes on trunk of infested trees.

Management Options

Options for managing mountain pine beetle depend on the size of the outbreak, the age of the stand, the size of the trees, and the conditions of the site.



High hazard lodgepole pine stand.

Silvicultural Alternatives: Over mature pine stands of large diameter, densely stocked trees are more likely to experience a devastating beetle outbreak than stands of other conditions.

Thinning stands of lodgepole and ponderosa pine can prevent or minimize beetle-caused mortality. Patch cutting in lodgepole pine stands creates a mosaic of tree age and sizes, and reduces acreages highly susceptible to beetles at one time.

Where clear or patch cutting is not feasible, selective harvesting can help reduce mortality. Trees can be harvested selectively within a riparian zone, along roads, in campgrounds, and around scenic vistas.

If the beetles are removed with salvaged wood and disposed of, some reduction in the beetle population can be expected. However, once a large outbreak has developed, salvage logging of infested material to reduce future tree mortality generally will not be effective.

Insecticides: Spraying before trees become infested will protect individual, high-value trees. Such preventive treatment will be necessary for as long as the outbreak lasts.

These insecticides are reviewed continuously by the U.S. Environmental Protection Agency. Persons contemplating the use of such insecticides should ensure that they are properly registered.

Pheromones: Pheromones are beetle-produced chemicals emitted to either attract a mate or affect populations to their advantage. Female beetles making an initial attack, use these attractant pheromones to attract the males. Beetles also produce anti-aggregating pheromones, which repel future attacks once a particular tree contains all the beetles it can support. Synthetic beetle attractants are now available to manipulate and monitor small outbreaks.

Conclusion

Long-term management of pine forests offers the best means of preventing or minimizing damage by the mountain pine beetle. Immature stands should be periodically thinned to maintain vigorous tree growth, reduce moisture stress, and remove trees damaged by weather, disease, or other agents. Mature or over-mature stands growing in areas actively managed, should be considered for regeneration. At that time it may be appropriate to consider the introduction of non-host tree species to the site.

In non-Wilderness areas, sound and timely silvicultural practices – to include salvage of infested trees before beetles emerge from them – can prevent bark beetle outbreaks.



For additional information, contact any USDA Forest Service or State Forestry Office in your area

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