



Colorado State Forest Service
Insect Information Series
MPB #1

Solar Treatment of Mountain Pine Beetle Trees

The mountain pine beetle (MPB) is an insect which attacks and kills ponderosa, lodgepole and limber pines in Colorado. It has a one-year life cycle, with adult flight and attacks on new trees occurring between mid-July and mid-September. Once a tree is successfully attacked, it dies within a few weeks and cannot be saved. The entire crowns of such trees normally turn reddish-brown about 8-10 months after first being attacked (i.e. in late spring or early summer). In certain situations even though an infested tree is dead, it may be desirable to treat it in a manner that kills developing beetles. Doing so should reduce the threat that emerging beetles pose to nearby pines.

While reliable chemical options exist for killing a high percentage of beetles in logs, this fact sheet details alternative solar methods. These can be fairly effective if done correctly and the weather cooperates. Beetle mortality of 50-75% is a realistic expectation of well-designed solar treatments.

Solar Treatment Without Plastic

Infested trees should be identified as early as possible. Since beetles fly primarily in August, detection can be done with confidence after October 1. (See information elsewhere on how to detect MPB-infested trees). Cut down and delimb the infested tree. MPB infests only the trunk column, from the ground up to where the trunk narrows to about 6 inches. Section this portion of the trunk into pieces that can be easily arranged and rolled (usually logs 4 to 8 feet long).

Proper solar treatment requires a good site. Ideally the location will receive full sunlight for the better part of the day, particularly during afternoon. The best locales are either flat or south-facing. North-facing hills are not particularly effective locations.

Only bark surfaces directly exposed to the sun will get hot enough to kill beetles or dry out their subsurface habitat; therefore, arrange the logs side-by-side in a single layer. Do not pile logs on top of one another or build a cordwood stack.

The logs need to be rolled periodically to ensure all sides have been "sunny side up" for a period of weeks during warm months of the year. Usually one-third of the log's circumference can be treated at a time. Thus, a given log would need to be shifted twice following the original position to be fully treated. To help track treatment progress, a mark could be placed on the cut ends of at least a few logs to indicate the starting orientation.

Each log position needs to receive about a month of warm weather exposure. This points out the desirability of identifying infested trees early (in fall if possible) and of initiating solar treatment early.

A typical treatment schedule might be: Position 1 (October thru April), Position 2 (May) and Position 3 (June).

Toward the end of June, the condition of beetles could be checked. If excessive survivors are noted, chemical treatments could still be performed to prevent emergence.

Solar Treatment With Plastic

Generally the same guidelines apply as to timing and location of this treatment. With this method, once placed under plastic the orientation of the logs is usually not changed. The keys to successful treatment with plastic are: 1) raising the temperature of the logs, and 2) increasing humidity and mold growth beneath the bark. Both high temperatures and mold deter and/or prevent normal beetle development.

Identify infested trees. Prepare these trees for treatment as above, with the possible exception of cutting the wood into smaller pieces (2-foot long firewood pieces, for example). Mold tends to grow in from the cut ends. A higher percentage of the inner bark area would get moldy in short pieces than long pieces. Remember to keep the treatment material one log, or at most, two logs, high. Place in a sunny location.

If possible, logs should be made wet just prior to covering with plastic to enhance mold growth. If you cannot artificially water the logs prior to covering, try to wait until just after a rain. (Note: this mold should not greatly reduce the wood's utility as firewood if the plastic is removed in a timely manner, i.e. the following summer).

Use **clear** plastic, not black. Clear plastic allows sunlight to penetrate and heat up the logs. Black plastic becomes hot while the logs stay cool. Choose material that is at least 6 mils thick. After covering the logs, seal the edges with surrounding soil. Repair all tears in the plastic with duct tape. Select plastic that comes in rolls wide enough to eliminate the need for splicing.

Again, logs treated in this manner should be under plastic for a period of at least two warm months. Bark beetles can chew through the thick bark of mature pines. Beetles emerging under plastic-covered logs sometimes die, but usually just chew through the plastic and fly away.

Plastic from log treatments should eventually be removed before it deteriorates and becomes litter.

Once infested, pine logs **will not** become reinfested with MPB. Other insects of no real threat to living trees, such as various wood boring beetles and carpenter ants, do colonize pine logs. Sometimes the noise and boring dust they produce are annoying, but their damage is minimal.

David Leatherman, Entomologist
Colorado State Forest Service

For additional information about Mountain Pine Beetle and other treatment options contact your nearest office of the Colorado State Forest Service, Cooperative Extension or U.S. Forest Service.

Solar Treatment for Mountain Pine Beetle

Solar treatment may be appropriate in some areas of Colorado to reduce beetle populations in infested trees. This treatment may be carried out with a small number of logs in high value areas. There are two options of solar treatment: with plastic sheeting, and without plastic. Below is a brief description on set-up and difficulties when using solar treatment. **Contact your local forester for more details on solar treatment.**



Plastic	6-mil clear plastic	No
Logs	Clearly identify infested trees with larva Cut trees to 4 ft. logs Make group of 5-7 logs, 1-layer	
Start date	Early spring (mid-April, early May)	
Duration	At least 8 weeks	
Location	Southern exposure Open, sunny area with several hours of direct sunlight	
Temperature	Logs need to reach temperatures of 110°F or more	
Prep.	<ul style="list-style-type: none"> • Water logs previous to covering • Seal edges with dirt 	<ul style="list-style-type: none"> • Rotate logs • Every 3 weeks rotate 1/3 of a turn
Difficulties	<ul style="list-style-type: none"> • Plastic disposal • Ants may nest inside plastic • Logs may not reach 110°F • Insects can chew through plastic • Plastic may rip, repair with duct tape • In lodgepole forests it may be difficult to find open areas 	<ul style="list-style-type: none"> • Rotation • Logs may not reach 110°F • In lodgepole forests it may be difficult to find open areas