EB0936

insect answers

PINE BARK BEETLES

Pine bark beetles are the most destructive insects of ponderosa and lodgepole pines in the Northwest, attacking pines in forest and backyard settings. They are particularly severe in northeastern Washington among ponderosa pine (also known as western yellow pine, bull pine, or blackjack pine). Beetle-infested trees appear dead or have needles that are quickly turning reddish-brown. Sometimes just the tops of trees die. Globs of pitch mixed with sawdust can sometimes be seen up and down the tree trunk. These are signs of beetles boring into the tree to lay eggs.

Some of the following conditions may be mistakenly attributed to bark beetle damage. Porcupines climb to the top of a tree and debark it, leaving an open scar on the trunk. The top of a tree will appear dead until one of the living branches takes over as a new leader and the tree continues to grow. Also, an annual needle drop occurs in pines in the fall when many of the inner needles on each branch die and fall off. New needles grow from the ends of the branches in the spring. This is natural and differs from bark beetle damage in that only the inner needles die while those at the tip of the branch remain healthy.

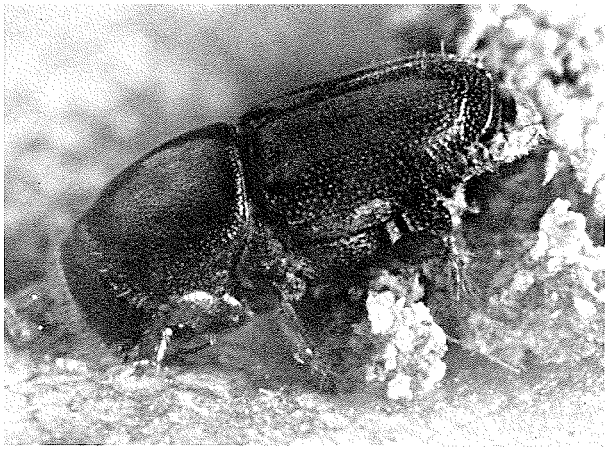
There are four main types of bark beetles in eastern Washington: mountain pine beetle, *Dendroctonus ponderosae;* pine engraver beetle, *Ips pini;* Western pine beetle, *Dendroctonus brevicombis;* and red turpentine beetle, *Dendroctonus valens.* All have similar life stages with eggs laid under the bark, larvae tunneling under the bark, resting pupal stages, and adults emerging and flying to other trees. Mountain pine, western pine, and red turpentine beetles prefer to attack larger trees while Ips beetles prefer younger trees or tops of older trees. All bark beetles are attracted to weakened or stressed trees.

Mountain Pine Beetle

Mountain pine beetles attack mature trees, usually larger than 7 inches in diameter. They attack the tree from the ground level up to where the trunk is 4 inches in diameter. The beetles bore under the bark, destroying phloem (a sap conductive tissue), and carrying spores of the blue stain fungus which infect and clog the conductive tissue. The tree dies from dehydration.

Mountain pine beetle adults are brown or black and just under 1/4 inch long (Fig. 1). They enter trees in July and August and lay eggs under the bark of the main trunk. Eggs hatch into white, legless, thick-bodied larvae, and the insect spends the winter in this stage. In the early spring the larvae complete their feeding on the phloem and pupate. Adult beetles emerge from mid-June to July and fly from the infested trees to other trees and the cycle begins again.

Signs of mountain pine beetle infestation are fading foliage, cream to orange colored pitch tubes on the



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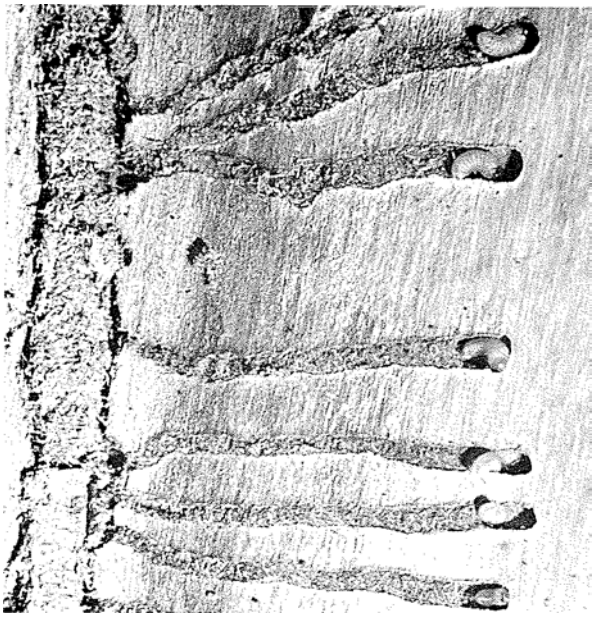

Fig. 2. Mountain pine beetle galleries.

Fig. 4. Ips beetle galleries.

trunk, and presence of reddish boring dust. Dark blue streaks may be seen under the bark from the blue stain fungus. The tunnels of the adult insects run up the tree in straight lines while larvae tunnel straight out from these galleries (Fig. 2). The galleries are packed with wood dust and insect excrement.

Ips or Engraver Beetle

Ips beetles attack immature pines or tops of older trees. They bore in the inner bark destroying phloem, causing dehydration and eventual death of the tree.

Adults, which are reddish-brown or black and approximately 1/8 inch long, are easily recognized by the depression at their posterior end (Fig. 3). They overwinter in duff under trees. Beginning in April, when temperatures are warmer, they fly to fresh slash or downed green limbs and tunnel into the phloem and lay eggs. Larvae, similar to but smaller than mountain pine beetle larvae, develop and tunnel outward in the phloem from the forked adult tunnels (Fig. 4). They pupate and become adults, emerging from the slash in late June. These adults attack dense thickets of standing immature pine trees. Eggs are laid and larvae develop for a second generation. Adults of this second generation emerge in the fall when temperatures are cooler and drop to the ground where they will overwinter in the duff.

Signs of Ips beetle infestation include fading foliage, red boring dust on the outer bark, and forked galleries in the inner bark. The Ips galleries are clean and convoluted in comparison to the straight tunnel pattern of mountain pine beetle.

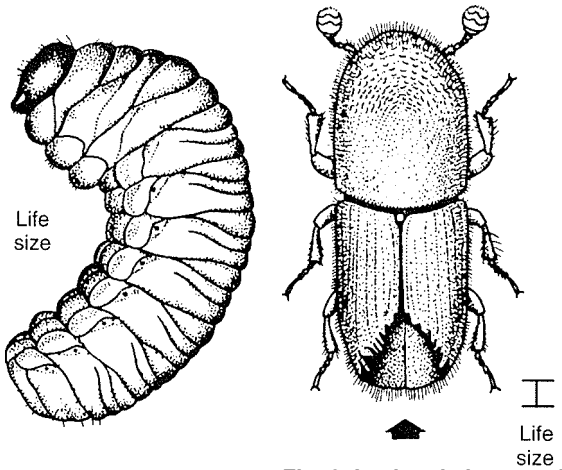

Fig. 3. Ips beetle larva and adult. Note concave depression in adult's posterior end.

Western Pine Beetle

Western pine beetles attack ponderosa pine 6 inches or more in diameter. Adults and larvae feed in phloem, introducing blue stain fungus. Galleries that are vertical and horizontal and wind back and forth across each other are typical of this beetle.

Adults are dark brown or black, less than 1/4 inch long. They attack trees in early or late summer.

Some pitch and reddish boring dust may be visible on the trunk indicating beetle entry.

Red Turpentine Beetle

Red turpentine beetles prefer older and weakened or injured ponderosa and lodgepole pines but can infest any pine and sometimes other conifer hosts.

Adults and larvae feed in the phloem layer of the tree. Adults may introduce spores of blue stain fungi which compound damage to phloem tissue. Galleries are irregularly shaped (but tend toward vertical) and 1/8-1/4 inch wide. Larvae feed June through October.

Adults are 3/8 inch long, reddish brown, and the largest of the *Dendroctonus* beetles. They fly from spring to mid-summer.

Large red pitch tubes are apparent around lower 3 feet of trunk.

Control and Protection

There is no control for pine bark beetles once they have entered and infested trees.

Beetles cannot successfully invade healthy trees. Therefore, the best and most practical method of control is preventing their attack.

- Water trees sufficiently. This is of key importance, especially under drought conditions. Overnight soakings are recommended. Deep irrigation in late fall is helpful.
- Fertilize trees in spring if growth is poor or tree is yellowing overall.
- Remove diseased or injured trees.
- Thin overly-dense trees to reduce competition for light and water.
- Cut down infested trees during the dormant season or before beetles emerge.
- Remove downed trees and any slash before beetles produce new broods.
- If wood is to be used for firewood, cut into lengths and cover completely with plastic. This prevents beetles from moving to other trees. The heat created by the plastic will kill beetles and larvae.
- Protect trees from damage during construction projects. Avoid injury to trunks and roots.
- Never allow more than 4 inches of soil to be placed over the ground in which trees are growing.

Two measures will help protect trees from Ips beetles: (1) removal of green slash from forest stands, especially before April; and (2) thinning dense stands of young pine trees. Cutting trees during sum

Fig. 5. Checking for pine beetle infestation.

mer months and scattering the slash will allow it to dry out and make it less attractive for infestation the following spring.

Carbaryl (Sevimol) insecticide can be used as *a protective* measure on highly valued trees, but this is a preventive measure only and is not effective once beetles have entered trees.

tive ingredient solution or use Sevimol at 20 oz. 40% EC per 100 gallons of water (Sevimol 6.5 oz./1 gal or 65 oz./ 100 gal).

Apply 1 gallon of either mixture per 50 square feet of bark surface. Spray from ground level up to a height at which the trunk diameter is 5 inches or less. Apply once annually before flight of adult beetles.

Use carbaryl mixed with water to obtain a 2% ac

	Mt. Pine	**W. Pine**	**Red Turp.**	**Ips**
Larvae present	fall & winter	most of year	June-Oct.	spring, early summer
Adult description	black, 3/16"	browm, black < 1/4"	reddish bown, 3/8", largest of beetles	reddish brown or black, 1/8"
Gallery pattern	vertical, straight, J-hook	vertical, horizontal, criss-cross, serpentine	irregular but mostly vertical	Y or H shaped, tunnels are clean
Time of attack	mid-summer	early or late summer	spring, mid-summer	spring, mid summer
Size of tree attack	> 5"	> 6"	older, weakened	young or tops of older trees
Host	all pines	ponderosa pines	ponderosa & lodgepole, will attack other conifers	all pines
Pitch tubes	yes, obvious	inconspicuous	large, bottom 3' of tree	inconspicuous
Dust	yes	yes	sometimes	yes
Blue stain fungus	yes	yes	yes	yes

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