

Life Cycle:

The spruce beetle in the Rocky Mountains generally requires two years to develop from egg to adult. However, spring and fall temperatures that are warmer than normal expedite development producing one year beetles.

In the two year cycle, populations are not synchronized and attacking adults emerge on an annual basis. Adult beetles are cylindrically shaped, approximately 1/4 inch (6 mm) long and 1/8 inch (3 mm) wide and are brownish-black to black with reddish-brown to black wing covers.

Adult emergence is dependent on temperature. Emergence usually begins when the maximum temperature in the shade exceeds approximately 61°F. Trees may be attacked as early as May with some adult flight occurring into September. Peak adult emergence generally lasts five to six weeks with the heaviest flights occurring in June.

Eggs of the spruce beetle are ovoid, pearly white, and about 1/16 inch (1.5 mm) long.



Larvae are stocky, legless grubs that grow to about 1/4 inch (6 mm) at maturity.



Pupae are white, inactive, and somewhat similar in size and shape to adults.



When adults emerge from their pupal stage they are white. The adult gradually darkens becoming light brown, then dark brown before turning mostly black.

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SPRUCE BEETLE

A bark beetle affecting Engelmann spruce



Spruce beetle and Engelmann Spruce

The spruce beetle attacks spruce trees, almost exclusively, Engelmann spruce. In severe outbreaks, blue spruce may also be attacked.

Normally this beetle is present in small numbers in weakened or windthrown trees. However, sporadic outbreaks have killed extensive areas of spruce trees. Such outbreaks commonly develop when a disturbance creates downed trees on susceptible landscapes.

The spruce beetle can rapidly increase its numbers in this downed material if it is not removed, chipped or burned. If bark beetle populations increase, they can readily attack and kill standing green trees. Spruce beetles prefer dense forests with a high percentage of larger diameter mature spruce. Mature spruce trees are usually attacked first but, younger, smaller trees are also killed during outbreaks.

How does the beetle damage a tree?

When an adult beetle finds a suitable host tree it chews through the outer-bark to the *phloem* tissue. The *phloem* tissue is the layer just under the bark which transports nutrients and water throughout the tree. Within this tissue the adult bark beetle constructs a tunnel called an egg gallery. In the gallery, the eggs are laid in short rows on alternating sides.



Larval Feeding Galleries

After the eggs hatch, the larvae feed on the phloem tissue creating galleries that are perpendicular to the main egg gallery. The resulting destruction prevents the transport of nutrients and water through the tree, resulting in its death.



How do you know when a tree is infested?



Pitch Mass

When a beetle chews through the bark it produces a reddish boring dust. Successfully attacked spruce trees have this boring dust in bark crevices and especially around the base of the tree. Pitch masses may also be visible on the tree bole at the entrance site. In the fall or winter following spruce beetle attack, the tree is often debarked by woodpeckers. Partially debarked trees are very noticeable even from a distance.

Needles on bark beetle attacked trees generally remain green for one year following the initial attack. Needles often turn yellowish-green in the summer following the previous years attack.



Boring Dust

Control:

Once a tree is heavily infested, tree mortality occurs. Trees that are not infested or lightly infested, can be treated using preventative sprays. Adult beetles and other life stages under the outer bark are not affected by these preventative treatments.

For protective sprays to be effective, trees must be sprayed up to 50 ft in height on all sides of the trunk including the root collar and larger exposed roots at the base of the tree. Surfaces missed or not treated effectively can still be attacked. Carbaryl® sprays are usually effective for up to two years and should be reapplied until the insect outbreak has abated.

The risk to uninfested trees may be reduced by removing infested trees. Infested trees should not be moved to sites where other uninfested spruce is found. Felled trees can be sold as commercial wood products, burned, debarked or chipped. Burning the outer bark completely will ensure mortality of all insect life stages. Whenever this practice is used, please be aware of the wildfire potential.

Managing forest vegetation to promote species and age class diversity will reduce spruce beetle impacts. A vegetation management plan for private landowners can be developed to reduce the effects of spruce beetle caused tree mortality. The Division of Forestry, Fire and State Lands can assist with developing a vegetation management plan.