White Pine Weevil

Yukon Forest Health — Forest insect and disease

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Yukon
Energy, Mines and Resources
Forest Management Branch

Introduction

The white pine (spruce) weevil (*Pissodes strobi*) is an insect that feeds on the terminal growth of pine (*Pinus spp.*) and spruce (*Picea spp*). The weevil was first reported in the early 20th century in eastern Canada and since then it has migrated west across North America. Because spruce is the favoured host in western Canada, the insect adopted the name "spruce weevil"; however, it commonly attacks various species of pine in other parts of its range. The white pine weevil has become a regular occurrence across a vast majority of Canada and the USA, although it is currently absent from Yukon forests. The most northerly extent of the known weevil range is in and around the Fort Nelson region. Given the current climate trends, it is possible the weevil could expand its range up the Rocky Mountain trench into southeastern Yukon.

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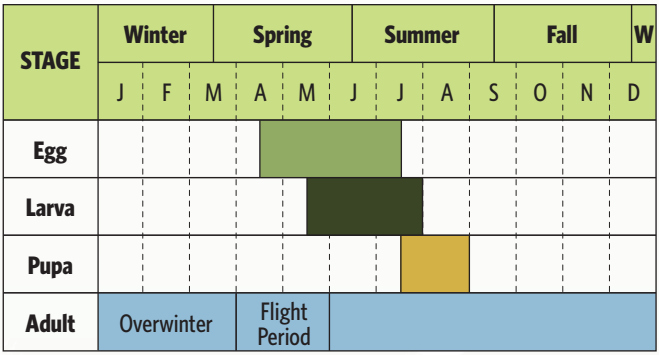
Life Cycle



The weevil cycles through one generation per year. Starting in spring when the temperature rises to an average of 2–4°C, the weevils emerge from their overwintering sites in the duff. The weevils attack host trees by either crawling or, on sunny days, flying. Once suitable host substrate has been found the weevils proceed to climb to the top of the terminal shoot where they feed then mate and lay their eggs in the sapwood of the previous year's leader. The female creates egg laying cavities in the bark with her rostrum. The months of late April to mid-July are when the eggs are laid. Eggs take approximately 10 days to hatch depending on weather conditions.

As the larvae emerge, they burrow into the bark and excavate downwards on the cortex and phloem killing the entire leader, but not before the new leader has elongated, so the weevil actually kills two years of terminal growth. When the weevil kills the year-old shoot the new shoot quickly desiccates and wilts forming the characteristic "shepherd's crook" that is one of the primary symptoms of infestation. When the feeding period ends, the larvae burrow into the pith or under the bark to immerse themselves in pupal cells lined with strands of wood chips.

The transformation to an adult weevil forms a depression in the sapwood of the tree. After pupation has occurred within the leader, new adults emerge during the months of August and September, feed until the temperature drops in the fall, and then seek out their desired overwintering site in the duff. It is not uncommon for larvae and pupae to overwinter in the shoots and mature the following spring. So although there is one generation per year, there can be some overlapping of broods. Although only one generation is bred each year, weevils can live to continue laying eggs for several years.

Temperature variations can affect the timing of the egg hatch and therefore alter the speed with which the weevil spreads. A delay in emergence of adult weevils will be caused by a cool or wet summer whereas a hot dry summer will increase the emergence of the weevils.

Definitions:

Rostrum: *beaklike projection of the anterior part of the head of certain insects.*

Cortex: *outer portion of the stem or root of a plant.*

Phloem: *the tissue in trees that transports nutrients found just below the bark.*

Host Species Attacked and Damage

Tree species attacked: In British Columbia and Alberta the weevil favors such hosts as Sitka spruce (*Picea sitchensis*), white spruce (*Picea glauca*) and Engelmann spruce (*Picea engelmannii*), although black spruce (*Picea mariana*), and occasionally lodgepole pine (*Pinus contorta*) are also at risk.

Most of the damage is caused by larval feeding. The leader of infested trees is usually destroyed from the inside out. The damaged leader is very susceptible to secondary damage such as heartrot fungi. If the terminal leader is killed a forked top can occur. The competition of split leaders for dominance can lead to the formation of weak tissues at the point of contact with the bole, or main stem of the tree. These weakened points are often prone to failure under heavy wind or snow loads resulting in a broken top. Weevil damage rarely causes tree mortality.

Key features for identification:

- Adults are reddish brown to black in colour with cream markings on their shells. They range in length from 0.4 to 1.0 cm. They have a distinctive long snout that curves down.
- Pupae are white in colour.
- Larvae are grub-like with a yellowish tinge, legless and up to 1.2 cm.
- Eggs are small (1 mm), white, with a pearly shine.
- Curved, dead leader on young stands of spruce often forming the "shepherd's crook."
- Discharge of resin from the wounds that were created at the tip of the previous year's leader.
- Blackish fecal caps are displayed over the punctures that were created during oviposition.
- Presence of small (2–3 mm) exit holes on the leader.

Similar damage

The spruce weevil inflicts similar damage to that of the lodgepole terminal weevil; however, their difference lies in the location of oviposition. Spruce weevils lay their eggs in the phloem of the one year growth, while the lodgepole terminal weevil lays its eggs in the new growth of the primary shoot.

A soft and weak leader can become bent by strong winds and can be mistaken for weevil damage. Weevil damage can also be mistaken for frost damage as well as bird damage. For many different reasons a healthy new lead may slightly droop causing confusion as it may appear to be a "shepherd's crook." Weevil signs include adult exit holes in, and chip cocoons within, the year-old leader.

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