

CONE AND SEED INSECT PEST LEAFLET No. 5

British Columbia Ministry of Forests and Range, Tree Improvement Branch, Saanichton, BC

SPRUCE CONE MAGGOT (*Strobilomyia neanthracina*)



Strobilomyia neanthracina adult on cone

TAXONOMY:

Order (Family): Diptera (Anthomyiidae)

HOST: Most spruces in North America.

DISTRIBUTION: Widespread throughout range of spruce in North America. Other species of *Strobilomyia* are associated with red and black spruces in the east. *S. neanthracina* is associated with white spruce and may be the only species in western spruces.

DAMAGE: Larvae bore through cones around the cone axis, destroying scales and seeds and producing characteristic spiral tunnels with resin but little or no frass.



Characteristic holes in spruce cone with no associated frass

There is usually little external evidence of damage except for inconspicuous larval exit holes. Severely damaged cones may turn brown prematurely. Damaged cones are usually smaller than healthy ones.

Is there a picture somewhere of an external view of a damaged *Strobilomyia* cone? Or three?

Spruce cones with signs of feeding by *Strobilomyia neanthracina*

IMPORTANCE: Spruce cone maggots are the most serious pest of spruce cones and seeds in North America. Usually no more than two or three larvae will be found in one cone but this number is sufficient to cause complete destruction of seeds. **Seed losses tend to be higher in established seed orchards than in natural wild stands. Is this true?**

Is the insect site specific? More a problem some places than others? A problem in the interior or on the coast or both?

DESCRIPTION

Life History: One generation per year. Adults emerge in spring, and are attracted to spruce female conelets during the pollination period. The females lay their eggs singly between conelet scales. At the time of oviposition, the female marks the cone, leaving a chemical behind which discourages other female flies from laying their eggs on the same cone. Usually only a few eggs are laid in any one

cone. (Do you want both or just one of these pictures?)



Spruce cone maggot egg in a dissected cone scale

Egg: Pearly white, ovoid with one end flattened, about 1.6 mm x 0.5 mm long. Eggs are deposited singly between conelet scales.



Spruce cone maggot (larva) on cone tissue

Larva: Larvae hatch in 1-2 weeks. There are 3 larval instars, the first developing within the egg. Second and third instar larvae tunnel around the central cone axis feeding on scale tissue and seeds for about a month. Larvae are whitish, elongate maggots, with a distinctive pair of dark mouth hooks. At maturity, they are about 5-7 mm long. Mature larvae tunnel to cone surfaces and drop to the ground by mid-July.



S. neanthracina larvae and pupae (darker brown)
(from a laboratory colony)

Pupa: Pupation occurs almost immediately after the larvae drop to the ground. Pupae overwinter in soil or litter and may enter an extended diapause of more than one year. Reddish-brown, darkening with age, oblong, about 4-6 mm long.

Adult: Shiny black, resembling a small housefly, about 6 mm long. Usually only seen in early spring on or near spruce conelets during pollination period.

DETECTION AND MONITORING

In spruce seed orchards, spruce cone maggot populations should be monitored every year at the conclusion of pollination to find eggs.

The folks in Alberta do some sort of sequential sampling method to determine whether they should use control tactics. Would you like to comment?

Dissect conelet samples and determine the average number of eggs/conelet. Only 0.3 eggs / conelet (in a sample of 50-100 conelets) indicates a probable seed loss of 15%.

Do you also sample for larvae? Are traps being developed for *Strobilomyia*?

Insect stage calendar to be added by me

CONTROL

If predicted seed loss is unacceptable, apply systemic insecticides to crop trees as per recommendations. (Will you add to this?)

Biocontrol options?

Need a photo of *Strobilomyia* impacted cones (exterior) vs. a healthy cone.

Non-crop cones should be picked and destroyed within three weeks of conclusion of pollination to kill larvae before they emerge from infested cones. In natural stands, prior to harvest, examine mature cone samples for tunnelling damage and numbers of filled seeds remaining.

KEY REFERENCES

Hedlin, A.F. 1974. Cone and seed insects of British Columbia. Canadian Forestry Service, Pac. For. Res. Cen., Victoria, BC. BC-X-90. 63 pp.

Cerezke H. 2003. blurb on the Alberta Sustainable Resource Development site..... www.srd.gov.ab.ca/forests/health/seedandconepests/spruceonemaggot.aspx.

PHOTOGRAPHS: Dion Manastyrski unless otherwise noted.