

CONE AND SEED INSECT PEST LEAFLET No. 10

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

GREEN SPRUCE APHID (*Elatobium abietinum*)



E. abietinum nymphs and adult on spruce needle

TAXONOMY:

Order (Family): Homoptera (Aphididae)

HOST: Spruces (especially Sitka and Engelmann) and rarely on Douglas-fir and pines. Ornamental spruces are very susceptible to this insect.

DISTRIBUTION: Native to western Europe, but well established in western North America throughout the range of Sitka spruce from Alaska to California and, on Engelmann spruce, as far inland as southeastern Arizona.

DAMAGE: On spruce, *E. abietinum* feeds preferentially on the underside of one year old or older needles in the lower third of the crown. In outbreak situations, aphids may become more evenly distributed, affecting both the leader and upper crown of the tree.



Aphid feeding on Sitka spruce

Aphid feeding is generally evident in late winter or early spring as yellow patches on needles. Needles eventually turn completely yellow and drop from the tree during spring and summer. Trees can lose a large proportion of their needles, becoming thin or bare on the inside. The current year's needles are usually undamaged. **Need something about mortality-eg. Prince Rupert and SE Arizona.**



Green spruce aphid defoliation

The effects of the spruce aphid on cone production have not been quantified.

Due to the small size of individual aphids (1.0 mm to 1.5 mm), feeding is difficult to observe directly and damage is often the first indication of aphid activity.

IMPORTANCE: *Elatobium abietinum* can be a very serious spruce defoliator especially on ornamental, young or stressed trees and in plantations and seed orchards. All damage occurs prior to budburst. **This is the only serious insect pest of spruce that causes damage during the winter.** Severe attack may result in growth loss and tree mortality.

E abietinum is a coastal problem only (so far) in BC – so, all coastal spruce seed orchards are at risk and suffer effects at least occasionally. To date, interior spruce seed orchards have not been affected. But this may change – as indicated by problems in Arizona Engelmann forests over the last decade.

DESCRIPTION

Life History: In North America, there are only 2 forms of this aphid: parthenogenetic (bearing live young) wingless (apterous) and winged (alate) females. The wingless form is by far the most predominant morphotype throughout the year.

Egg: *No eggs are laid by North American populations of the green spruce aphid.*



Wingless female with offspring

Nymph: Nymphs resemble small wingless adults. They are 0.5-1.4 mm long. Populations increase when these nymphs develop into wingless females.

Adult: Tiny, green, oval, 1.0-1.5 mm, dull red eyes, and predominantly wingless. They have long cornicles terminally on the abdomen. Winged individuals appear during the dispersal phase as the temperature rises in late spring.



Winged female green spruce aphid: the dispersal phase

DETECTION AND MONITORING

Early detection of active populations in late winter is critical to control this insect. In BC, warm early and midwinter weather often leads to population outbreaks. Green spruce aphid shows distinct preferences for individual trees. Any tree suffering defoliation one year is likely to be attacked in later years.

Monitor aphids in trees weekly by visually examining needles or by beating branches over white sheets (paper on a clipboard works well) starting in late January or early February.

CONTROL

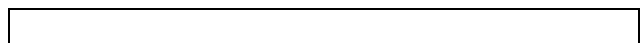
Weather appears to be a major regulating factor on green spruce aphid populations in BC. Mild, winter weather often triggers population outbreaks, while cool, overcast periods will maintain populations at low levels. Sudden drops in temperature and/or spring frosts can reduce aphid numbers in late winter or early spring before damage occurs, thereby lessening the amount of spring damage to trees.

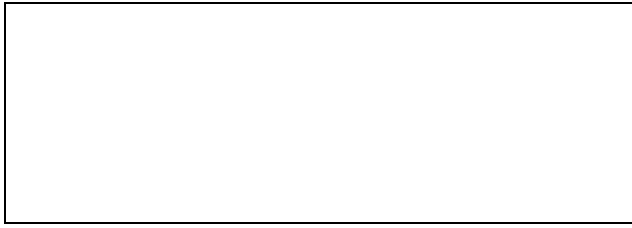
If control is believed warranted, then a spray should be applied when population levels start to climb or before needle damage is visible. Regular monitoring in late winter and early spring is critical for success. If population levels are high, contact the BC Ministry of Forests and Range cone and seed specialists or the BC Ministry of Agriculture and Lands for current recommendations on chemical control of this aphid.

Do you want to talk about genetic resistance to the aphid and any programs that might be ongoing? I don't know if there is any interest in this in BC. We would have to ask the spruce breeder – I think this is John King.

Do you want a line drawing of the aphid and its cornicles? Bob Footitt might have one we could use. Actually, it would be good to get him to review this sheet after editing by Ward and Jim.

An insect monitoring calendar to be included.





Heavy feeding activity by *E. abietinum* on spruce

KEY REFERENCES

Bergvinson D. 1988. The green spruce aphid, *Elatobium abietinum* (Homoptera: Aphididae): A review of its biology, control and status in British Columbia. B.Sc. Undergraduate thesis, Simon Fraser University, Burnaby, BC. 35 pp.

Hedlin AF. 1974. Cone and seed insects of British Columbia. Canadian Forest Service, Pacific Forestry Research Centre, Victoria BC. BC-X-90. 63 pp.

Ruth DS, Miller GE, Sutherland JR. 1982. A guide to common insect pests and diseases in spruce seed orchards in British Columbia. Canadian Forest Service, Pacific Forest Research Centre, Victoria BC. BC-X-231. 28 pp.

PHOTOGRAPHS: Dion Manastyrski