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# Cone and Seed Insect Pest Leaflet No. 13

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



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## SPRUCE CONE AXIS MIDGE (*Kaltenbachiola rachiphaga*)

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*Kaltenbachiola rachiphaga* adult on spruce cone

**TAXONOMY:**

Order (Family): Diptera (Cecidomyiidae)

**HOST:** Principally Engelmann and Sitka spruce but also black, red, and white spruce.

**DISTRIBUTION:** Widespread throughout host ranges in Alaska, Canada, and northeastern and northwestern United States.

**DAMAGE:** Although spruce cone axis midges can be common and many larvae may occur in a single cone, impact to seed production is normally negligible. Larvae tunnel through scale tissue (usually no more than one larva per scale) and eventually into the cone axis, but do not attack seeds. Generally there is no external evidence of damage.

Very high *Kaltenbachiola* densities are very rare, but can cause scale death, premature cone opening, and loss of seeds. Axis midge larvae may be misidentified as spruce seedworm caterpillars (*Cydia strobilella*, a potentially serious cone pest).



Spruce cone axis midge-damaged cones

**IMPORTANCE:** Spruce cone axis midge is not usually considered a pest of conifer seed production.

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## Description

**LIFE HISTORY:** Adults emerge from pupal cocoons in old cones during the host pollination period, usually around May or June. Eggs are laid at bases of conelet scales. Young larvae enter scale tissue near an ovule, mine through the tissue, and enter the cone axis by mid-summer. Feeding finishes in mid-summer and larvae spin papery cocoons in axis cavities where they overwinter. They are capable of extended diapause. Larvae pupate the following spring, and adults emerge about ten days later.



**Adult *Kaltenbachiola*?**

Adult spruce cone axis midge on interior spruce cone

**EGG:** Whitish, oblong, 0.3 x 0.1 mm, laid at base of conelet scales at pollination time. Eggs are difficult to see without a microscope.



Spruce cone axis midge eggs on spruce conelet

**LARVA:** Larvae are readily visible in bases of scales or in the axes of dissected cones. Yellowish-orange, flattened, about 3 mm long, spatula lacking (only visible with a microscope), head capsule faintly sclerotized.



Mature *K. rachiphaga* larvae at the base of the cone scales

**PUPA:** Larvae pupate in the spring. They are whitish in the early stages, darkening as they mature. About 2.5 mm long, within white papery cocoons in the cone axis.



*K. rachiphaga* pupa in cone axis

**ADULT:** Tiny, fragile mosquito-like fly about 2 mm long with a dark abdomen and clear wings. Similar to *Contarinia oregonensis*, (Cone and Seed Insect Pest Leaflet No. 2), but dark bodied.

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## Insect stage calendar

Insect stage calendar to be added

I think a nice diagram of insect life cycle would be good here, maybe drawings to show where in the cone the insects are located.  
[RB1] What does everyone think?

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## Detection and Monitoring

If high populations of this insect are a consistent issue, then early spring conelet dissections should be conducted to search for eggs, similar to what is regularly done for *Contarinia oregonensis* in Douglas-fir. There should also be routine monitoring at mid-season or harvest time by doing half-cone cuts to assess numbers of overwintering larvae.

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## Management and Control

There is usually no reason to manage populations of spruce cone axis midge. If harvest time cone assessments suggest that populations are unusually high efforts should be made to reduce the numbers of overwintering larvae. Remove and destroy all non-crop cones from seed production site and, if crop cones are to be processed nearby, arrange to have spent cones destroyed after seed extraction. This will destroy overwintering larvae and may reduce populations to acceptable levels in the following year.



Spruce cone axis midges in the cone axis

## Key References

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**PHOTOGRAPHS:** Ward Strong and Dion Manastyrski.

**More photos this summer?**