

CONE AND SEED INSECT PEST LEAFLET No. 1

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

REDCEDAR CONE MIDGE (*Mayetiola thujae*)



Mayetiola thujae adult on redcedar foliage

TAXONOMY:

Order (Family): Diptera (Cecidomyiidae)

HOST: Western redcedar

DISTRIBUTION: Found in Washington, Oregon and British Columbia wherever western red cedar is found.



M. thujae puparium with developing pupa inside.

DAMAGE: Redcedar cone midge larvae feed on scales and seeds throughout individual cones. Each larva is capable of destroying more than one seed.

IMPORTANCE: Redcedar cone midge is the most serious pest of redcedar cone and seeds in BC and may destroy entire crops. Mature infested cones are generally smaller than uninfested ones and cone scale margins may split and turn brown.



DESCRIPTION

Life History: One generation per year. Adult emerges in early spring (March) during redcedar pollination period. After mating, female midges lay eggs on pollen-receptive seed cones.

Egg: orange-red (vermillion) and cylindrical, about 0.8 mm long by 0.2 mm wide. Contrast with green colour of cones makes redcedar cone midge eggs relatively visible to the naked eye.



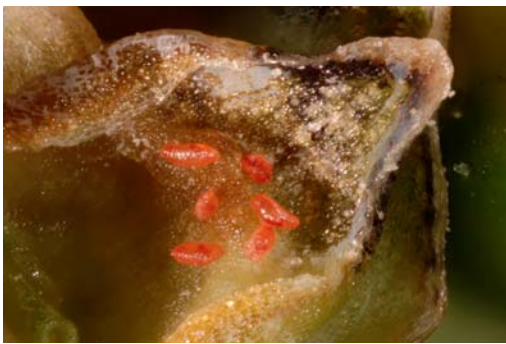
M. thujae eggs on a redcedar cone

Eggs are found on or between cone scales either singly or in groups numbering up to 45.



Redcedar cone midge eggs on redcedar cone scale

Larva: Eggs hatch in April and developing larvae feed throughout the cone, each destroying more than one seed. Larvae are orange, about 3-4 mm long when fully grown, and generally resemble the shape of the eggs. Larvae may be found anywhere within the cone tissue.



M. thujae larvae on an exposed redcedar cone scale

Pupa: In late summer / early fall, each larva constructs a thin, white, papery puparium within which it turns into a reddish brown pupa and rests through the winter. Pupation is completed in the late winter. Pupae that are ready to emerge as adults become much darker and some adult features can be seen under their “skin”.



M. thujae pupa extracted from the puparium



M. thujae pupa extracted from puparium. Above image is of a mature pupa almost ready to emerge as an adult. Legs and other features of the adult midge are visible.

Adult: The small, (about 3 mm long), dark grey, mosquito-like adults have clear wings with a small number of distinct veins. There are many species of midges that look like this and field identification of redcedar cone midges is difficult to do unless the adults are reared from redcedar seed cones, captured in traps baited with cone midge sex pheromone, or observed laying eggs on cone scales.



Mayetiola thujae adult on redcedar foliage

DETECTION AND MONITORING

Redcedar cone midge populations should be monitored on an annual, ongoing basis in seed orchards and controlled when necessary. Redcedar conelet surveys should be performed on a weekly basis from immediately after redcedar pollination is finished (March) until midge egg-laying is completed (late March to early April).



Do you like this picture for the blurb?

Samples should comprise one conelet from each of a minimum of 50 trees. For each conelet, record the total number of scales infested with one or more midge eggs. The orange coloured eggs are usually quite visible against the contrasting green cone tissue. A decision to control cone midge populations will depend in part upon the current value of a crop and the immediate need for seed but, as a general rule of thumb an average of greater than 50% of conelets having one or more infested scales indicates that control may be warranted.



Redcedar conelets with eggs just visible

A population monitoring program using insect traps baited with redcedar cone midge sex pheromone is in development but is not yet available for operational usage.

Need a calendar to describe monitoring in the seed orchard early stages and then in the field for wild populations later stages.

CONTROL

If populations are deemed unacceptably high, a foliar spray of systemic insecticides applied 1-2 weeks after 10% of the eggs have hatched (usually mid-April in British Columbia) will provide good control. Currently, dimethoate is the only active ingredient registered in Canada that seems to be effective.

Hand picking and destroying all non-crop cones have been recommended as a method for reducing redcedar cone midge populations. However, this is only likely to be an effective control measure in seed orchards grown in isolation from natural or planted western redcedar trees. Greenhouse, container-grown redcedar seed orchards tend to be unaffected by cone midges. A control option utilizing the redcedar cone midge sex pheromone may be available in the future.

KEY REFERENCES

- Gries, R. R.G. Bennett, G. Khaskin, and G. Gries. 2007. Attraction of male *Mayetiola thujae* (Diptera: Cecidomyiidae) to the sex pheromone of (2S,12S)-, (2S,13S)-, and (2S,14S)-diacetoxyheptadecane is reduced in the presence of the SR- or RR-stereoisomers. *The Canadian Entomologist* 139: 685-689.
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PHOTOGRAPHS: Dion Manastyrski unless otherwise noted.