

SPRUCE CONE INSECTS

IN BRITISH COLUMBIA

A.F. HEDLIN

Good spruce cone crops occur about once in 5 years. The increasing demand for seed for reforestation purposes makes it imperative that appreciable amounts of seed be obtained in

these good years. Because insects are capable of destroying large quantities of seed, they are an important factor in influencing the amount of quality seed produced.

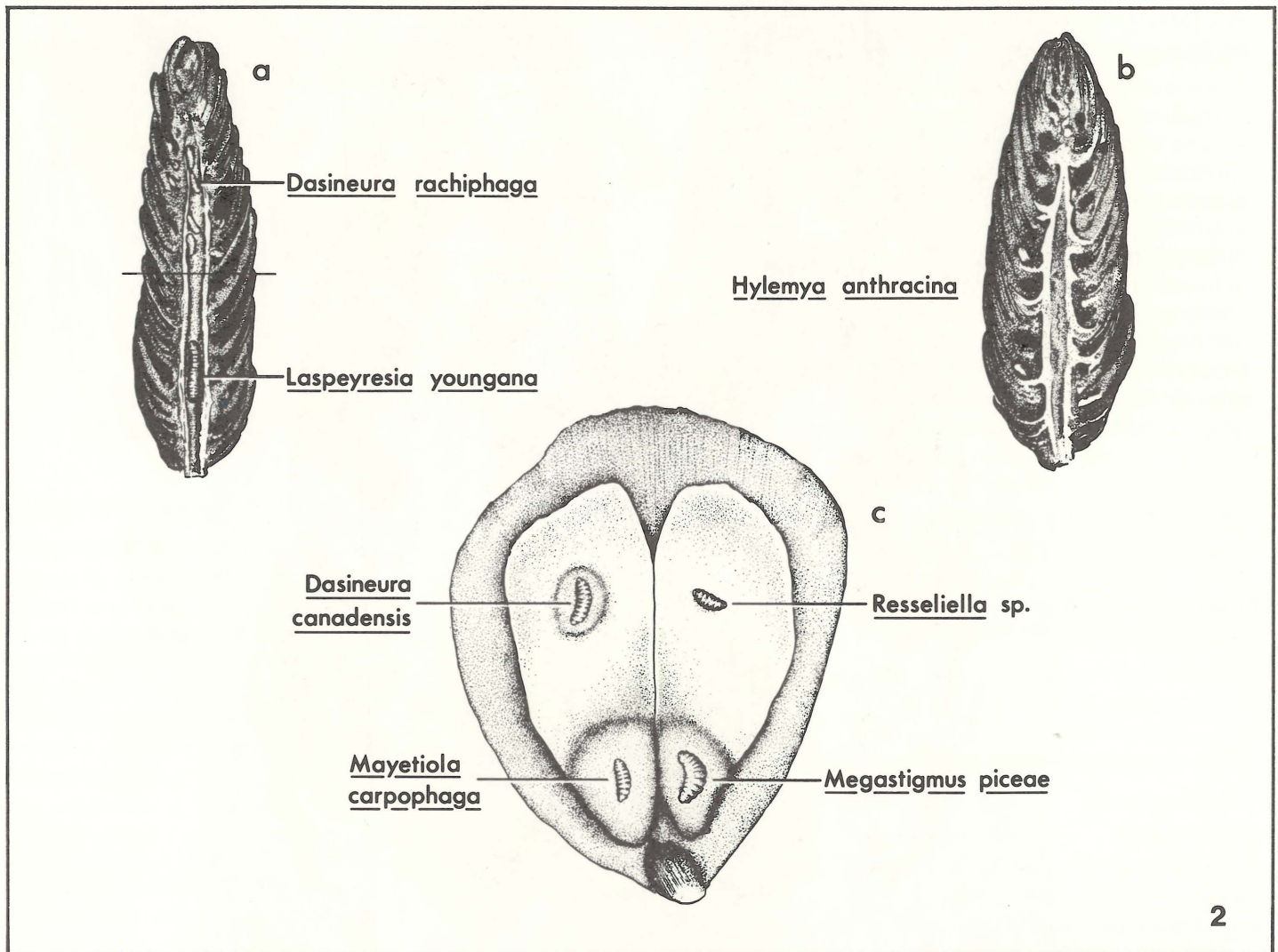


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Cone and seed damaging insects

Most cone-feeding insects lay their eggs in young flowers or conelets in early summer. The larvae feed during the summer when cones are growing, and it is during this period that most damage occurs. In late summer, when cones are reaching maturity, damage to infested cones can be readily observed. It is not usually visible from the exterior, but when cones are bisected longitudinally most damage is readily apparent (Fig. 1). Different insects cause damage in different parts of the cone, because of their varying feeding habits. Typical damage by the more important species is shown in Fig. 2.



A spiral cone borer, *Hylemya anthracina*

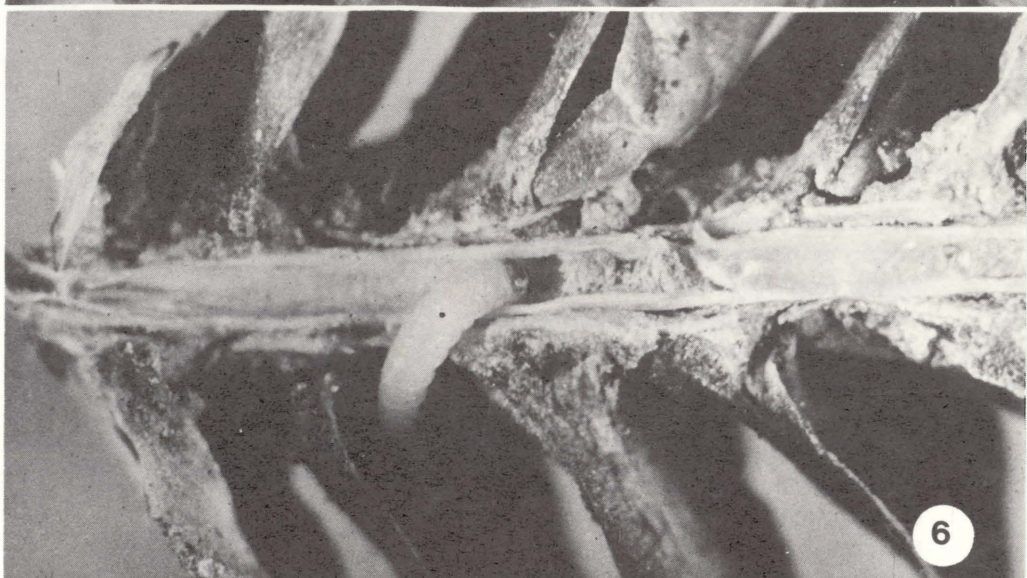
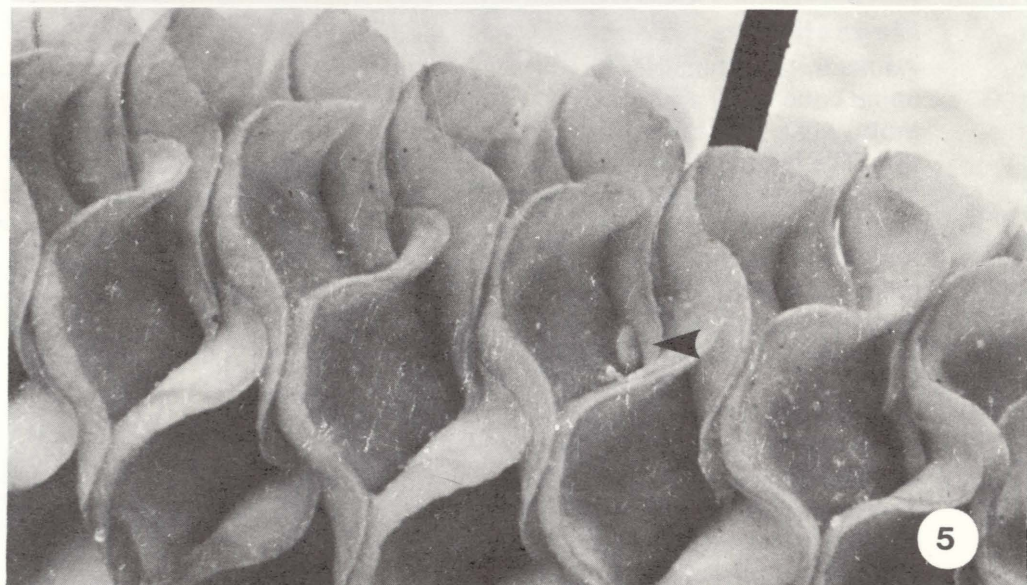
Adult insects emerge in May and early June and lay eggs singly among the young cone scales (Fig. 3). After hatching, the young larvae start to feed, making spiral tunnels around the axis, feeding on seeds and scale tissue. The larvae are active and feed voraciously, causing considerable damage over a short period of time. During the second half of July, they bore to the surface of the cone and drop to the ground. Here, they enter the litter, and remain overwinter as smooth reddish brown puparia (Fig. 4).

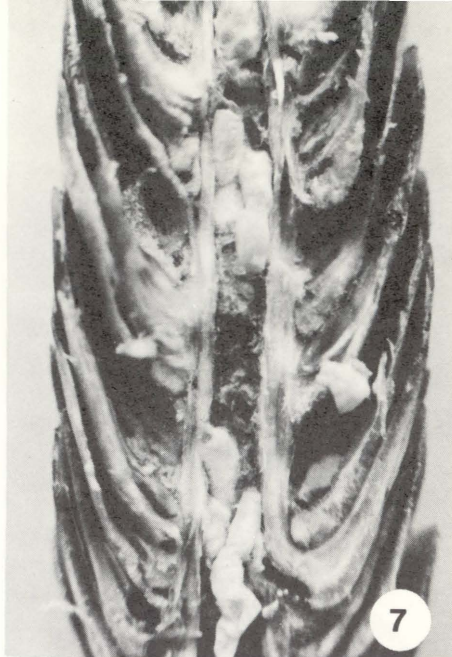
The spiral cone borer is one of the most destructive insects in spruce cones. Damage is apparent in bisected cones as a series of holes along either side of the cone axis (Fig. 1):

The spruce seed moth, *Laspeyresia youngana*

Adult moths fly during June. They lay eggs (Fig. 5) during the pollination period and until cone scales become closed. The eggs start hatching about mid-June, and the young larvae feed in seeds throughout most of the summer. When fully grown in August and September, they tunnel into the cone axis and remain there over winter (Fig. 6).

This insect is a frequent inhabitant of spruce cones and, like the spiral cone borer, causes considerable damage. When larvae of both species are present in the same cone, it is difficult to distinguish the damage of one from the other.





A spruce seed chalcid, *Megastigmus piceae*

Adults fly later than those of the spiral cone borer and spruce seed moth, when cones are closed and firm. The female lays its eggs individually in seeds. Each larva feeds in a seed and, after feeding, remains in the seed until the following spring. This species, not usually plentiful, is not a significant factor in spruce seed production.

Spruce cone midges

Several different species of midges lay their eggs in spring when conelets are open for pollination. Although some are very plentiful, they are not serious seed destroyers.

The spruce cone axis midge, *Dasineura rachiphaga*, lays eggs near the young ovules, and the larvae, after feeding for some time in the scales, migrate to the cone axis. Here, they spin delicate cocoons in which they remain over winter (Fig. 7). This insect is very common in spruce cones, but since it does not come in direct contact with seeds, probably is not particularly destructive.

A spruce cone gall midge, *Dasineura canadensis*, feeds, during the larval stage, in galls in the cone scales. A single larva is present in each gall, which may be

near to, or remote from, the seeds. This species is not plentiful.

A spruce seed midge, *Mayetiola carpophaga*, lays its eggs in the micropylar opening of the seed when the cone is being pollinated. Larvae remain in the seeds throughout the summer and until the following spring. The species is not a serious pest.

A cone resin midge, *Resseliella* sp., lies between cone scales, causing scale discoloration (Fig. 8). In spite of its presence, frequently in large numbers, it is probably not very destructive.

Control

Experiments conducted against spruce cone insects using systemic insecticides showed that dimethoate was effective. When applied at 0.5% active ingredient in water as a spray to young cones just after pollination, most of the insects in cones were killed. Germination tests on seed from treated cones showed that the insecticide had no harmful effect on the seed.

Discussion

Cone and seed insects may cause significant seed losses in spruce. Where seed is being produced under managed conditions, i.e., seed orchards or seed production areas, damage can be controlled or reduced with the systemic insecticide dimethoate. It is not practical to attempt control in natural stands, and when serious damage occurs in such areas from which cone collection is planned, it will be necessary to search for other suitable areas.

Caution

Pesticides can be injurious to humans, domestic animals, fish and other wildlife if not handled properly. Use all pesticides carefully and follow recommended practices for disposal of surplus pesticides and containers.

For further information contact:
Pacific Forest Research Centre
Canadian Forestry Service
506 West Burnside Road
Victoria, B.C.
Phone 388-3811

