
Cone and Seed Insect Pest Leaflet No. 11

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



WHITE PINE CONE BEETLE (*Conophthorus ponderosae*)



Conophthorus ponderosae adult on white pine cone (D. Manastyrski)

TAXONOMY:

Order: Coleoptera (beetles)

Family: Curculionidae: Scolytinae (bark beetles)

HOSTS: Various pine species. In British Columbia, particularly western white pine (*Pinus monticola*), but also ponderosa pine (*P. ponderosae*) and, less commonly, lodgepole pine (*P. contorta*).

DISTRIBUTION: Western North America from southern Yukon Territory, through British Columbia and the western United States to the Sierra Madre Range in Mexico.

DAMAGE: *Conophthorus ponderosae* can be a serious pest of western white pine cones. Adult female beetles tunnel into the base of second year cones, severing the conductive tissue, and killing the cones. Pitch tubes and boring dust are often evident at the attack site on cone bases. Beetle larvae tunnel within the killed cones and destroy all developing seeds. Attacked cones may remain on the tree but usually fall to the ground in early summer.



Pitch tubes of *Conophthorus ponderosae* at base of cones in western white pine (S. Kegley)



Conophthorus ponderosae damaged and undamaged cones (S. Kegley)

IMPORTANCE: Up to 90% of a cone crop can be destroyed; seed mortality is 100% within each infested cone. Female cone beetles generally lay their full egg complement in one cone only. This insect has not yet become an issue in British Columbia seed orchards but it causes considerable damage in natural stands (e.g., in the naturally blister-rust-resistant western white pine stands on Texada Island). It is also a problem in white pine seed orchards in Idaho.

Description

LIFE HISTORY: One generation per year.

EGG: Oval, whitish, approximately 0.6-1.0 mm long. Eggs are laid in galleries excavated along cone axes in late spring and early summer.



Conophthorus ponderosae eggs in egg gallery along cone axis (N. Gillette)

LARVA: “C” - shaped, white, legless, with amber to light brown head, between 1- 3 mm long. Larvae hatch and feed on partially developed seeds and other internal cone tissues, completing their development in approximately one month.



Late instar *Conophthorus ponderosae* larva exposed in a dissected western white pine cone (Canadian Forestry Service)

PUPA: Pupation occurs during summer within dead cones. Pupae are white, and transform to teneral adults after 4-5 days, which gradually darken and harden over several weeks.



Conophthorus ponderosae larvae and pupae in dissected western white pine cone
(N. Gillette)

ADULT: A small beetle (2.4 - 4.0 mm), dark brown to black, with clubbed antennae, and covered with moderately long hairs; head concealed when viewed from above.

Adult females fly to and tunnel into second year cones in late spring and early summer. Their progeny mature into new adults within cones during the summer and usually overwinter there (some may leave the cones in late summer and fall, to overwinter elsewhere).



Conophthorus ponderosae adult on white pine cone (D. Manastyrski)



Adult *Conophthorus ponderosae* and excavated egg gallery in a western white pine cone (S. Kegley)

Detection and Monitoring

In British Columbia, this insect has not yet (2010) become an issue in pine seed orchards and is actively monitored only in affected natural stand seed production sites. Bisection of 2nd year cones collected at any time in the growing season will reveal cone beetle activity. Depending upon collection date, infested cones will contain reproductive adults, eggs, larvae, pupae, and/or new adults as well as some amounts of tunnelling and larval feeding damage. Early season damage can be detected through presence of small pitch tubes at cone bases. Dead cones falling from trees in mid-summer are a good indication of cone beetle infestation; bisect fallen cones to confirm presence of beetles. Traps baited with cone beetle sex pheromone can be used for early season population detection and monitoring.

Control

Careful collection and destruction (*e.g.*, raking and burning) of all infested cones during the summer months can provide effective control but is not feasible in natural stands. In order to protect cone crops in the blister-rust-resistant white pine seed production stand on Texada Island, seed production trees are climbed in spring and second year cones are bagged to exclude invading beetles.

Key References

- Bennett, R. 2000. Management of cone beetles (*Conophthorus ponderosae*, Scolytidae) in blister rust resistant western white pine seed orchards in British Columbia. *Seed and Seedlings Extension Topics* 12: 16-18 (available from <http://www.for.gov.bc.ca/hti/publications/newsletters/Vol1201Aug20.pdf>).
- Furniss, M.M. 1997. *Conophthorus ponderosae* (Coleoptera: Scolytidae) infesting lodgepole pine cones in Idaho. *Environmental Entomology* 26: 855-858.
- Hedlin, A.F., H.O. Yates III, D.C. Tovar, B.H. Ebel, T.W. Koerver, and E.P. Merkel. 1980. Cone and seed insects of North American conifers. Environment Canada, Canadian Forestry Service; USDA Forest Service; Subsecretaria Forestal y de la Fauna, Secretaria de Agricultura y Recursos Hidraulicos, Mexico.
- Miller, D.R., H.D. Pierce Jr., P. De Groot, N. Jeans-Williams, R. Bennett, and J.H. Borden. 2000. Sex pheromone of *Conophthorus ponderosae* (Coleoptera: Scolytidae) in a coastal stand of western white pine (Pinaceae). *The Canadian Entomologist* 132: 243-245.
- Rappaport, N.G., J.D. Stein, A.A. del Rio Mora, G. Debarr, P. De Groot, and S. Mori. 2000. Responses of *Conophthorus* spp. (Coleoptera: Scolytidae) to behavioural chemicals in field trials: A transcontinental perspective. *The Canadian Entomologist* 132: 925-937.