## White Pine Weevil *on spruce*

*Pissodes strobi* (Peck)
Coleoptera: Curculionidae

Alfaro, R. I. 1995. A sequential sampling system for the white pine weevil, *Pissodes strobi* (Coleoptera: Curculionidae). Journal of the Entomological Society of British Columbia 92: 39–43.

Alfaro, R. I. 1998. White pine weevil, *Pissodes strobi*: risk factors, monitoring and management. Tech. Transfer Note No. 4. Victoria, B.C.: Natural Resources Canada, Canadian Forest Service, Pacific Forestry Centre; 4 p.

**Objectives:** To describe a sequential sampling system for *P. strobi* damage in plantation-grown spruce and review risk factors for this pest.

**Abstract:** White pine weevil, *Pissodes strobi* (Peck), is an important pest of a number of spruces, *Picea* spp., and pines, *Pinus* spp., in North America. Larvae tunnel down through the terminal leader of host trees, destroying the apical dominance of the shoot. The resulting tree deformation reduces the commercial value of sawlogs and landscape trees. Stands of even-aged spruce trees, such as plantations or natural regeneration following a fire, are susceptible to attack when juvenile and are most susceptible when 10 and 30 years old. Attack by *P. strobi* typically does not kill older trees, but does reduce their growth rate.

A sequential sampling plan was developed to rapidly determine infestation levels of *P. strobi* in spruce. The method requires a maximum of 60 randomly selected spruce trees. All 60 trees must be sampled if the infestation ranges between 10–19%, but only 19 trees need be sampled sequentially to classify a stand as lightly infested. Infestations are considered light, moderate and severe if <10, 10–19, and ≥20% of the trees sampled have weevils. Young trees with accessible terminal leaders should be treated when warranted by pest pressure. Susceptibility of spruce stands to *P. strobi* can be minimized through careful selection of stand location, stand composition, and frequent monitoring when trees are young (≤30 years old).

**Sampling Procedure:**

**Sequential sampling plan** (described in Alfaro 1995, 1998): Divide the stand into a grid (e.g., a 5 m X 5 m grid) with assigned X, Y coordinates. Randomly select 60 X, Y coordinate points from the grid; a random number generator would be useful for this. Do not duplicate numbers or replace them in the selection process. Number each coordinate point sequentially from 1 to 60 in the order that they were selected.

Divide the list of coordinate points into 1–30 and 31–60. Beginning with 1–30, check the tree closest to the coordinate point in the stand for weevil damage. Move through the stand in an efficient manner and tally the number of trees with weevil damage; coordinate points do not need to be assessed sequentially. Plot the

cumulative number of infested trees against the cumulative number of trees sampled using Fig. 1. If the slope of the plotted data crosses either decision line, then the stand can be classified as either lightly or severely infested without additional sampling. If the slope does not cross a decision line and remains in the moderate zone, continue sampling the second group of 31–60 coordinate points. After sampling the entire second group, continue plotting the cumulative tally of infested trees against the cumulative number of trees sampled in the same manner. The stand can then be classified as having a light, moderate, or severe infestation after sampling a maximum of 60 trees in this manner.

| Stand classification | Level of observed damage |
|---|---|
| Light | <10% |
| Moderate | Between 10 and 19% |
| Severe | ≥20% |

**Risk factor evaluation** (Alfaro1998): Known risk factors for *P. strobi* include even-aged stands of spruce, host species with long leaders, spruce stands between 10 and 30 years old, and thinned stands with reduced density. Sites that accumulate more than 785 degree days above 7.2°C over a year also encourage weevil attack. Dominant deciduous trees can shade plantings, reducing the risk of attack.

**Note:** This sampling plan was developed for spruce trees and may not be applicable for pines attacked by *P. strobi*.

**Figure**

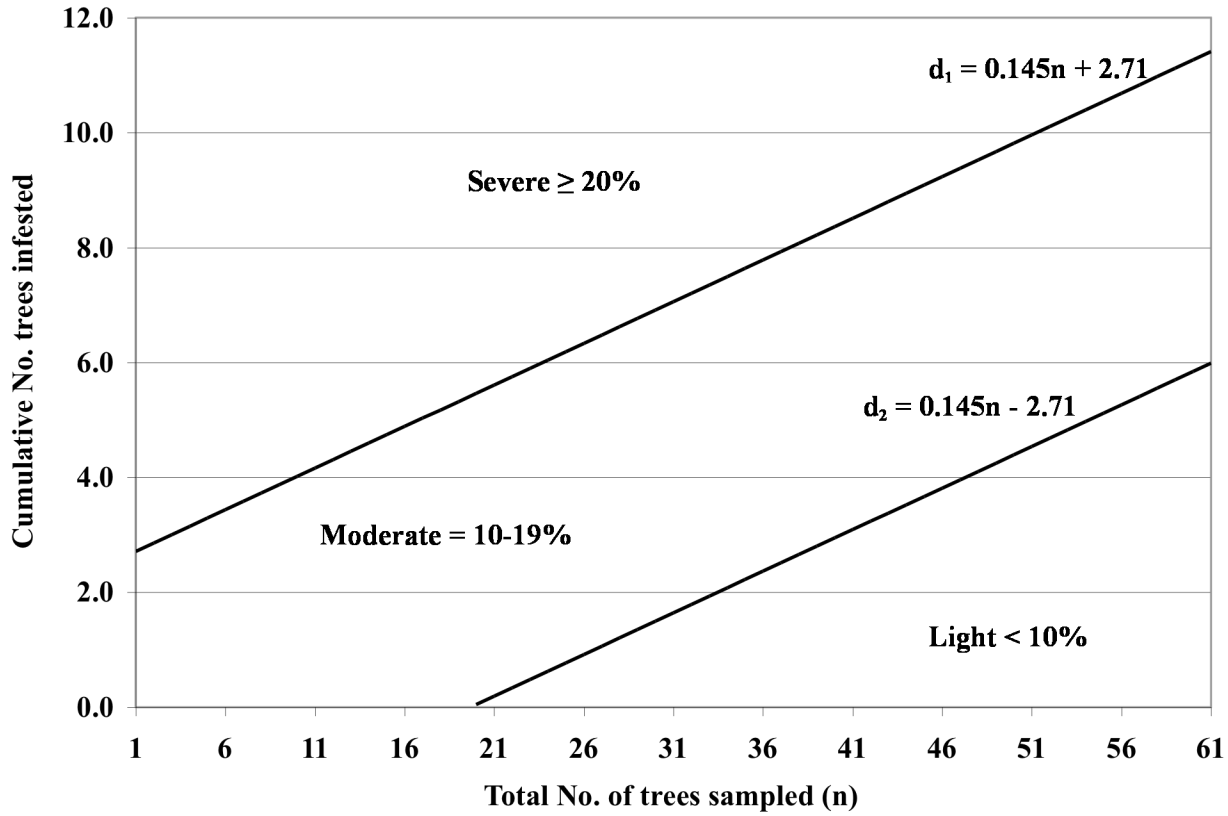


Figure 1. Parallel decision lines for a sequential sampling system for the white pine weevil, *Pissodes strobi* (Alfaro 1995).

Figure 1 reprinted with permission from the author, granted April 6, 2009.