

Fir Engraver

Scolytus ventralis LeConte

Coleoptera: Scolytidae

Berryman, A. A. 1968. Development of sampling techniques and life tables for the fir engraver, *Scolytus ventralis* (Coleoptera: Scolytidae). *Canadian Entomologist* 100: 1138-1147.

Objective: To develop sampling methods for a detailed, scientific study of *S. ventralis* inhabiting individual trees; and to describe methods for detecting *S. ventralis* populations occupying large areas.

Abstract: The fir engraver, *Scolytus ventralis* LeConte, is an important pest of true firs, *Abies* spp., in western North America. Outbreaks are associated with stressed trees caused by drought, wind throw, or competition in combination with favorable weather conditions for insect development. *Scolytus ventralis* is capable of killing sections, strips or patches of cambium and phloem without causing tree death. Severe infestations cause growth loss and tree mortality.

A method was presented for sampling and constructing life tables for *S. ventralis* inhabiting individual trees. A bark area of 464.5 cm² was determined to be an effective sample unit. The collection of two sample units from two vertical strata along the infested portion of the bole reduced within-tree variation. Trees were felled, and samples taken serially throughout the year. A sampling design was presented for increasing the precision of life tables, and for determining optimal sample sizes.

Sampling Procedure: The optimum sample unit was determined from the number of attacks on the tree bole according to Berryman (1968). Fell each sample tree. Cut a 30.5 cm long bolt from the infested portion of the tree at two strata. In the laboratory, remove a 464.5-cm² vertical strip of bark from the bolt, and count and record the number of attacks, total gallery length, eggs, larvae (by instar), pupae and adults. Larval instars are identified by their size, and their distance from the parent gallery (Ashraf 1968).

Serial sampling involves the removal of a set of samples from a single tree at several points during development of *S. ventralis*. Sample once every three weeks during active periods (summer and spring) and once during the overwintering period. It is estimated that 10 sample sets would be required during the one year life cycle of *S. ventralis*. For each subsequent sample, cut 15 cm above or below the previous sample. Refer to Fig. 3 to determine the number of samples required to estimate *S. ventralis* density with known precision.

Note: This paper includes detailed descriptions on estimating survivability of different life stages of *S. ventralis*.

References:

- Ashraf, M. 1968. Biological studies of *Scolytus ventralis* LeConte (Coleoptera: Scolytidae) with particular reference to the nematode parasite, *Sulphuretylenchus elongatus* (Massey). Pullman: Washington State University; Ph.D. dissertation. 81 p.
- Berryman, A. A. 1968. Distributions of *Scolytus ventralis* attacks, emergence, and parasites in grand fir. *Canadian Entomologist* 100: 57-68.

Figure:

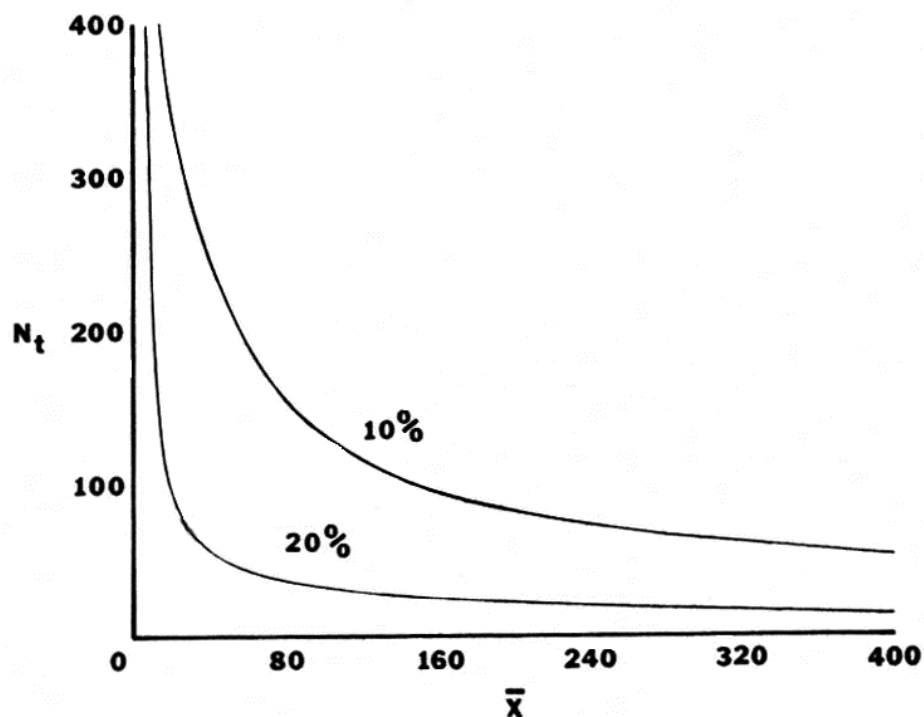


Fig. 3. The number of trees (N_t) required to estimate the mean density of *S. ventralis* at two levels of precision (SE = 10% and 20% of mean) and at various mean densities per mean square foot.

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