

Jack Pine Budworm

Choristoneura pinus Freeman

Lepidoptera: Tortricidae

Nealis, V. G.; Lysyk, T. J. 1988. Sampling overwintering jack pine budworm, *Choristoneura pinus pinus* Free. (Lepidoptera: Tortricidae), and two of its parasitoids (Hymenoptera). *Canadian Entomologist* 120: 1101-1111.

Objective: To develop a sampling method for estimating overwintering larval populations of *C. pinus*.

Abstract: The jack pine budworm is an important pest of jack pine, *Pinus banksiana* Lamb., and to a lesser extent red pine, *P. resinosa* Ait., in the Great Lakes region and Canada. Extensive top kill is common during outbreaks, but tree mortality is rare unless infestations coincide with periods of drought.

Data on the distribution of *C. pinus* collected between 1985-1987 in northern Ontario, Canada were used to develop guidelines for sampling overwintering larvae. Counts of the number of *C. pinus* per m of branch and the number per square meter of branch bark surface area for three crown levels and each cardinal direction were conducted. An entire branch was recommended as a sample unit because the 60-cm branch tip sections underestimated actual densities. The number of larvae per square meter of bark surface (Y) was related positively to the number of larvae per m of branch (X) ($Y = 110.8 + 29X$, $R^2 = 0.92$, $P < 0.01$, $n = 250$).

Sampling Procedure: Sample one branch randomly from the lower crown of codominant jack pine in late autumn through early spring when larvae are still overwintering. Record the branch length and butt diameter to estimate bark surface area. Larvae are forced out of the hibernacula using the forced emergence method (Miller 1958). Place bundles of branches and foliage in paper towels and suspend them over water basins to maintain high levels of humidity. Remove emerging larvae and record each larva found on the paper towel. Density is expressed as the number of insects per square meter of branch bark surface area. The optimal sample sizes for three levels of precision are provided in Table 3.

The relationship between the number of larvae per meter of branch (X) and the number of larvae per square meter of bark surface (Y) can be calculated by $Y = 110.8 + 29X$.

Reference:

Miller, C. A. 1958. The measurement of spruce budworm populations and mortality during the first and second larval instars. *Canadian Journal of Zoology* 36: 409-422.

Table:

Table 3. Number of branch samples required at different levels of precision and increasing density of *C. pinus*, using two methods to express their density.

Density of overwintering budworm larvae		Precision (%)					
		90%		85%		80%	
Per m	Per m ²	Per m	Per m ²	Per m	Per m ²	Per m	Per m ²
5	250	44	34	20	15	11	9
10	400	34	29	15	13	8	7
15	550	29	25	13	11	7	6
25	850	25	21	11	9	6	5
50	1550	20	17	9	7	5	4
75	2300	18	14	8	6	4	4
100	3000	16	13	7	6	4	3
125	3750	15	12	7	5	4	3

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