

## Winter Moth

*Operophtera brumata* (Linnaeus)

Lepidoptera: Geometridae

Reeks, W. A. 1956. Sequential sampling for larvae of the winter moth, *Operophtera brumata* (Linn.) (Lepidoptera: Geometridae). Canadian Entomologist 88: 241-246.

**Objective:** To develop a sequential sampling plan for fourth instars of *O. brumata*.

**Abstract:** Winter moth, *Operophtera brumata* (L.), is a significant defoliator of northern red oak, *Quercus rubra* L., in Nova Scotia where it was introduced accidentally in 1930. The range of *O. brumata* has expanded to include most of eastern Canada, portions of the northeastern US and western Canada. Severe infestations result in thinned foliage, branch dieback, and tree mortality.

A sequential sampling plan was developed for fourth instar *O. brumata* on red oak, *Quercus rubra* L., in Nova Scotia. Twelve clusters of leaves randomly sampled from the live crown of eight trees each was shown to be an adequate sample size to predict defoliation by *O. brumata*. An additional two trees can be sampled if the cumulative tally of *O. brumata* larvae from eight trees remains in the “continue sampling” zones indicated in Table II. Light, moderate and severe infestations corresponded with approximate defoliation levels of 0-25%, 35-80% and 90-100% on individual trees, respectively.

**Sampling Procedure:** Sample when fourth instar *O. brumata* are present, typically during the first two weeks of June in Nova Scotia. Randomly select eight red oaks within an area of concern. Remove 12 clusters of leaves from each tree from any part of the crown. A leaf cluster is defined as all the leaves on a current shoot. Examine the first cluster of leaves and tally the number of fourth instar *O. brumata* present. Reference Table II. If the tally falls within the light-moderate or moderate-severe zones, examine the next cluster of leaves for larvae and continue to reference Table II. Stop sampling when the cumulative count falls into a light, moderate, or severe zone. If all eight clusters are examined and the cumulative tally of larvae remains in the “continue sampling” columns, randomly select two more oaks and sample as above. Classify the infestation as “light-moderate” or “moderate-severe” as appropriate if no decision is reached after sampling 10 trees. Light, moderate and severe infestations correspond to approximate defoliation levels of 0-25%, 35-80% and 90-100% on a per tree basis, respectively.

**Notes:** This sequential plan may also be useful for fall cankerworm, *Alsophila pomataria* (Harris), which has a similar distribution and life history as *O. brumata*. Use this plan with caution for *A. pomataria* until it is validated for this species.

**Table**

Table II. Cumulative number of winter moth larvae per tree-sample (12 leaf clusters per tree-sample) for one to ten sample trees. Based on values for d as shown in text.

Tree	Cumulative number of larvae per tree-sample				
		Light-moderate zone, continue sampling		Moderate-severe zone, continue sampling	
1		3-23		24-54	
2		17-37		63-93	
3		30-51		102-132	
4		44-64		141-171	
5	Light Zone	57-78	Moderate Zone	180-210	Severe Zone
6		70-91		219-248	
7		84-105		258-287	
8		97-118		297-325	
9		111-132		336-365	
10		124-145		375-404	

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