Forest Tent Caterpillar

Malacosoma disstria (Hübner)
Lepidoptera: Lasiocampidae

Connola, D. P.; Waters, W. E.; Smith, W. E. 1959. The development and application of a sequential sampling plan for forest tent caterpillar in New York. Bull. No. 366, Albany: *New York State Museum*; 22 p.

Objective: To develop a sequential plan for *Malacosoma disstria* (Hübner) based on egg counts to predict defoliation levels.

Abstract: The forest tent caterpillar is a major defoliator of hardwood forests in the eastern USA and Canada. Young larvae feed on developing buds, while later instars feed gregariously on leaves often defoliating the tree completely. Defoliation causes reduced leaf area, growth loss, twig dieback and tree mortality in cases of prolonged infestation.

Three methods of obtaining egg mass counts were tested, including direct observation with binoculars, a cut-twig method, and whole-tree method where the sample tree was cut down and all branches examined for egg masses. The direct observation and whole-tree methods were shown to be ineffective. A sequential sampling plan was then developed in response to an outbreak of *M. disstria* in northern New York based on egg counts using the cut-twig method. The purpose of the plan was to predict, from year to year, the amount of defoliation simply classified as either noticeable or unnoticeable.

Sampling Procedure: Select 10 (76-cm) twig samples randomly from 25 trees in the area of concern. Sampling preference is given to cherry, *Prunus* spp., and poplar, *Populus* spp., trees wherever possible, and other susceptible species are used only to fill the 25 tree quota, if necessary. Begin by cutting and then examining 10 twigs from the first sample tree. The number of egg masses obtained will determine whether or not it is necessary to cut and examine an additional 10 twigs from another tree by referring to the classification thresholds in Table 2. If a decision is not met, take another 10 twig sample, record the cumulative total, and continue referencing Table 2 until a decision is made. Defoliation will be classified as unnoticeable or noticeable.

Table 2. Sequential plan for sampling forest tent caterpillar egg mass populations in New York. Sampling guide showing minimum numbers of 10-twig samples that must be taken in an egg mass survey t permit site classification with respect to expected forest tent caterpillar defoliation.

Number of 10-twig sample units	Cumulative Total Number of Egg Masses		
	No Noticeable Defoliation (≤)	Expected Defoliation is Doubtfull (keep sampling)	Noticeable Defoliation (≥)
1	---	0-5	6
2	0	1-7	8
3	2	3-9	10
4	4	5-11	12
5	6	7-14	15
6	8	9-16	17
7	11	12-18	19
8	13	14-20	21
9	15	16-22	23
10	17	18-24	25
11	20	21-27	28
12	22	23-29	30
13	24	25-31	32
14	26	27-33	34
15	28	29-35	36
16	30	31-38	39
17	33	34-40	41
18	35	36-42	43
19	37	38-44	45
20	39	40-46	47
21	41	42-48	49
22	43	44-51	52
23	46	47-53	54
24	48	49-55	56
25	50	51-57	58

This plan is set up with specified confidence levels. The chances are only 1 in 10 that a 'not noticeable' area will be called 'noticeable' and only 1 in 20 that a 'noticeable' area will be called 'not noticeable'. This means that 1 out of every 10 areas labeled 'noticeable' may show 'no noticeable' defoliation and 1 out of every 20 areas labeled 'not noticeable' defoliation may show 'noticeable' defoliation.

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