Gypsy Moth
Lymantria dispar (Linnaeus)
Lepidoptera: Lymantriidae

Objective: To determine the distribution of *L. dispar* egg masses in residential settings; and to compare the cost effectiveness of several sampling techniques for determining their density.

Abstract: The gypsy moth was introduced into Medford, Massachusetts in 1869, and is now a major defoliator of hardwoods throughout the northeastern USA and Canada. Defoliation results in reduced growth, decreased vigor and extensive tree mortality.

The spatial distribution of *L. dispar* egg masses was determined in 60 developed lots in a residential community of Maryland. The community was divided into low (393 egg masses per hectare) and high (2,656 egg masses per hectare) densities. In the high-density lots, the proportion of egg masses found on trees, man-made objects, and houses was 73.9, 21.6, and 4.5%, respectively. Distributions were similar in the low density lots. Oaks, *Quercus* spp., had the highest proportion of egg masses at both low and high population densities. The cost effectiveness of a number of potential sampling units (entire lots, back yards, fixed area plots, and individual trees) for determining egg mass density was also evaluated. The entire lot sampling units was most precise. However, 100-m^2 samples were most cost effective, and are therefore recommended for determining egg mass density.

Sampling Procedure: Fixed-area plots (Kolodny-Hirsch 1986) were compared with binomial sampling procedures (Binns and Bostanian 1990). Residential lots were surveyed by recording the number of egg masses found on all objects. These data were then used in a computer simulation to compare the reliability and cost effectiveness of sampling the lots for egg masses using 100-m^2 fixed-area plots, entire backyard plots, or individual trees (all species and oaks only).

Mark and delineate boundaries for each fixed-area plot sample. Locate and record the number of egg masses found on all trees, man-made objects, and houses. Disassemble stacked objects (such as firewood) to locate hidden egg masses. Use binoculars to examine taller objects, if necessary. Examine all egg masses in reach to determine if they are from the current (new) or previous generation (old). The number of egg masses (*EM*) per ha for each lot can be determined by:

$$EM/\text{ha} = EM \times [\text{new}/(\text{new} + \text{old})]/\text{area}$$

Note: The authors recommend further investigations of binomial sampling techniques because of their effectiveness and the ease of which residents can aid in monitoring programs. Methods for using the fixed-area plots are further discussed in Kolodny-Hirsch (1986). In low density lots, sampling time ranged from 97 min for a fixed area plot to 219 min for entire lot samples.

References:

Binns, M. R.; Bostanian, N. J. 1990. Robustness in empirically based binomial decision rules for integrated pest management. *Journal of Economic Entomology* 83: 420-427.

*Kolodny-Hirsch, D. M. 1986. Evaluation of methods for sampling gypsy moth (Lepidoptera: Lymantriidae) egg mass populations and development of sequential sampling plans. *Environmental Entomology* 15: 122-27.