Ministry of Natural Resources and Forestry

# Gypsy moth egg mass survey methods for woodlot owners

A gypsy moth egg mass survey is used to estimate the population of gypsy moth in a woodlot.

To find out if gypsy moth is present on your property, take a walk in your woodlot and look for gypsy moth egg masses. Egg masses are about the size of a quarter, and are covered with tan coloured, fuzzy hairs. They look like a piece of chamois. You can find them on the underside of tree branches, in bark crevices, and on branches, logs, and rocks on the ground.

If you see egg masses, you can estimate the gypsy moth population using an egg mass survey. The survey is used to sample part of your woodlot using what are called Modified Kaladar Plots (MKP). It's quick and simple. Results of the survey will be helpful to determine the need and planning for a pest management program.

The following are step by step instructions for doing the survey.

**Equipment needed:**

- Data sheet and pencil
- Flagging tape, ribbon, or tree paint
- 10 m (30 feet) measuring tape

## Step 1: Where to conduct the survey

Identify the areas of your property that would be most susceptible to gypsy moth defoliation. Susceptibility can be evaluated by looking at two factors: trees species and terrain.

Tree species that are very susceptible to gypsy moth include oak, poplar, aspen, birch, and basswood. For help in identifying the trees on your property, you can obtain tree identification guides in most book stores and libraries. You can also contact your local Ministry of Natural Resources and Forestry district office.

Terrain also influences gypsy moth defoliation, with high and dry ridges being most susceptible. Wet sites such as swamps are least susceptible.

Areas of your property most susceptible to gypsy moth infestation would be, for example, a high ridge covered with oak and poplar. Areas with low susceptibility would be cedar or balsam swamps. Another good place for the survey is where egg masses have been previously found, or where defoliation was observed. Find the areas of greatest susceptibility and establish your sample plots there.

## Step 2: Plot layout

Each MKP is 10 by 10 metres (0.01 hectares) and should be located away from open areas such as roads or trails to avoid inflated counts. Walk into your woodlot for about 20 metres and begin laying out the plot. Mark the first corner of the plot with flagging tape (or ribbon or tree paint) and run a diagonal line 7.1 metres to the plot centre. Mark the plot centre with two pieces of flagging tape and continue to run the diagonal line another 7.1 metres. Flag this spot as the corner opposite your starting point.

Complete the plot layout by running lines to the two other corners from the centre and flagging them. You now have a 10 x 10 metre square as shown below:
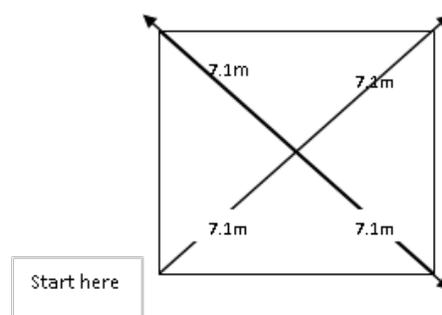
## Step 3: Distinguishing between new and old egg masses

It is easier to distinguish old from new eggs masses in the fall, because the new ones are generally darker. New egg masses are a tan to brown colour and firm to the touch. If pressed between two hard surfaces or squeezed between two finger nails; new eggs always pop. Old egg masses are usually bleached, chalky, and may be frail to the touch. In some cases, old egg masses, especially those on tree boles above the snow line, may be firm if the eggs did not survive the previous winter. However, old eggs do not usually pop. When doing the survey, only count the new egg masses.

## Step 4: Counting egg masses in the sample plots

The egg mass count consists of two separate counts, an **above ground count**, and a **ground count**. The **above ground count** includes all new egg masses found above the ground surface. This includes egg masses found on all parts of all the trees, shrubs, stumps, large rocks, branches, leaning sticks, etc., in the entire plot. A magnifying tool such as low power binoculars will help in seeing egg masses that are on high branches. Multiply this number by 100 to obtain the number of **egg masses per hectare above the ground**.

The **ground count** is made using 10 mini-plots within the main plot. Each mini-plot is 1 x 1 metre. They are arranged in the main plot, one at each corner, one half way down each side, one in the centre, and one at random, as shown below. Search carefully, counting the number of new egg masses found on the ground in each mini-plot. Then add up the number of egg masses from each mini-plot to find the **ground count**. Be sure to include all egg masses on the ground, under rocks, sticks,
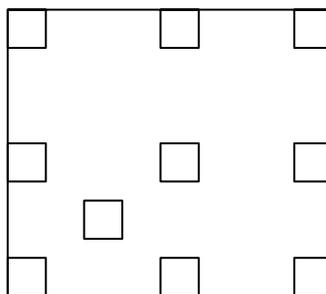
etc. Beware of hazards, such as poison ivy. Multiply the **ground count** by 1000 to obtain the number of **egg masses pe rhectare on the ground**.

Add the **egg masses per hectare on the ground** to the number of **egg masses per hectare above the ground** to get the **total number of egg masses per hectare**.

Egg masses per hectare on the ground     _____

Egg masses per hectare above the ground     _____

**Total egg masses per hectare**     _____

## Step 5: Interpreting the egg mass count

The MKP provides an estimate of the number of egg masses per hectare (EM/ha). This number can help you plan your management program. The more plots you do in the woodlot, the better idea you will have of the actual gypsy moth population. For example, in a 10 hectare woodlot, the average number of EM/ha from 5 MKPs should be a more accurate estimate than the result from a single MKP. Generally, the more variable the gypsy moth population is in the woodlot, the more MKPs are needed to give a good forecast.

Predicting future gypsy moth defoliation is more accurate at the beginning of an infestation than towards the end. Rates of parasitism and infection by pathogens (e.g., virus or fungi) typically increase the longer an infestation persists in an area. When this happens, even high counts of egg masses may result in low defoliation the following season, because the parasites or pathogens will ensure high gypsy moth mortality.

At the beginning of an infestation, an average of 1250 EM/ha generally indicates a population that will cause 40% or more defoliation the following growing season. Less than 40% defoliation is not readily visible to the untrained eye and will have minimal effect on tree health. Once defoliation exceeds 40% to 50%, it is readily visible and tree health can be adversely affected. Although trees that lose more than 50% of their foliage will usually refoliate, it isan additional stress and uses up starch reserves that would otherwise go towards future growth.

If egg mass counts exceed 4000 EM/ha, the population is healthy (low parasitism and infection rates) and the egg masses are large (i.e., quarter size or larger rather than dime size), greater than 50% defoliation should be expected. With healthy populations and counts exceed 10,000 EM/ha, 100% defoliation of susceptible trees can be expected.

In most locations in Ontario, gypsy moth populations have not remained high for more than 2 or 3 years. High rates of parasitism, and the fungus *Entomophaga maimaiga*, have usually contributed to population collapse. Nonetheless, effects on trees have included loss of aesthetic value, reduced growth, mortality, and increased vulnerability to other stresses such as drought and other insects (e.g., forest tent caterpillar). Tree mortality has been as high as 50% and is associated with additional stresses, particularly drought or poor site conditions.



Landowners considering forest pest management programs should contact their local Ministry of Natural Resources and Forestry and Ministry of the Environment, Conservation and Parks offices.