

## The Warm Winter of 2012 and What to Expect From Winter Moth in Massachusetts

Winter Moth (WM) (*Operophtera brumata*) is an introduced pest that has been well established in eastern Massachusetts and Rhode Island for about 10 years. It favors oaks, maples, birches, apple, crabapple, blueberry and other deciduous hosts here. It also is one of the first caterpillar pests to hatch from over-wintering eggs in the early spring; usually just prior to bud-break as host plant buds are swelling. If many caterpillars are able to wriggle into the swollen buds and feed then significant damage may occur to both leaf and flower buds. During some years, infestation was so high in Massachusetts, that many blueberry growers in Southeastern MA suffered severe losses due to winter moth caterpillars destroying the flower buds. For fruit growers (apple and blueberry, in particular), early detection and management is essential. Well-timed dormant oil sprays that contain added insecticide, such as a Spinosad product, can be useful on apple and blueberry if applied within a day or so of egg-hatch. The oil is effective against the eggs while the insecticide acts to knock down any newly hatched caterpillars. More than one one-well-timed application may be necessary. During the past 10-plus years in eastern MA and Rhode Island, winter moth caterpillars have caused anywhere from slight to near-complete defoliation of shade and forest trees depending on the year. Winter moth is a relatively new and invasive species for Massachusetts and its behavior here is not yet fully understood and the complexities for understanding it involve many variables. Massachusetts was the first state in the Eastern USA to discover an established presence of this pest. Recent research at UMass Amherst suggests that winter moth may have a strong potential to move southward from Massachusetts and then westward in the coming years to potentially become a regional and potentially a national problem.

Winter moth eggs have been sitting on the trunks and branches of host trees since late November into December of 2011. The timing of egg-hatch in the spring is influenced by the number of days below freezing throughout the winter months and, despite the warmer-than-normal daytime temperatures during much of this past winter, it is believed that we had the normal amount of cold nights this year. Then in the late winter / early spring, the eggs require a relatively small number of warm days for them to hatch. In Massachusetts, winter moth eggs have generally begun hatching approximately in mid-April during many of the past 10 years, which has been around April 15<sup>th</sup> for most of those years. However, two years ago, MA experienced exceptionally warm weather starting in mid-March and WM egg hatch began on the last day of March on Cape Cod and then on April 1<sup>st</sup> in Plymouth County. For such early-season egg hatch, only a few atypically warm days are necessary for earlier-than-normal egg hatch to occur. It has also been observed in MA that winter moth eggs on the sunnier sides of trees (generally the south side) may hatch as much as one week before the eggs on the shadier (northern exposure) side of the same tree here in Massachusetts.

This past winter has been atypically warmer than the norm for MA but most nights have been below freezing (32°F) leading researchers to believe that the number of ‘winter frost days’ has been approximately the same as in previous years in MA. However, MA did not experience many deeply cold days this past winter and the overall effect that this may have on winter moth eggs is not yet known. The majority of daytime temperatures during February were in the 40s with a few in the 50s (degrees Fahrenheit). The big question now is ‘*What has this done to the timing of winter moth egg-hatch for the upcoming growing season?*’ As of March 9<sup>th</sup>, in Plymouth County, there is no sign of the color change typical of winter moth eggs just before they hatch; they currently appear as they have in past years in MA at this time in March. Winter moth eggs begin as a greenish color and then turn pinkish-red sometime in December. As the embryo develops in late winter or very early spring, the egg becomes a powdery-blue and just prior to hatching, it turns a very deep blue-black. Given that winter moth is so new to Massachusetts, it is difficult to say for sure what the outcome will be but listed below the authors provide some speculation as to what the outcome may be and the factors that drive it:

- Intensive monitoring last November and December by Joe Elkinton’s lab indicates that much of eastern Massachusetts and most of Rhode Island currently have large populations of winter moth eggs waiting to hatch.
- Winter moth caterpillar needs to have its host plant bud-break phenology in close synchrony with egg-hatch. If the buds are still too tight for the tiny caterpillars to wriggle in, the caterpillar will ‘balloon’ (spin down on a long silken strand of silk to be carried by the wind)

in order to find a suitable host. If not successful, they may eventually starve to death. One possibility is that the eggs will hatch extremely early this year and the host plants will lag far enough behind with their bud swelling to be non-useful to the caterpillars leading to their starvation. Deciduous plants that are currently dormant will experience a slight effect from the warm winter but are not nearly as affected by these temperatures as are the insects and, therefore, may not be 'ready' for the winter moth should it appear much earlier than the norm. Success for winter moth is strongly tied to being in close synchrony with the host plant bud swelling and opening.

- Dr. Elkinton's lab has studied the natural controls that occur in Massachusetts for winter moth and, as expected, found just a scant few that utilize winter moth as a food source. However, the warm winter will most likely cause the insect predators, such as lightning bugs, ground beetles, and others to become active sooner; what their impact on the over-wintering eggs of winter moth will be this year is yet unknown. Also, microorganisms, such as fungi and bacteria, that can attack winter moth may perform differently this season and have a potentially greater impact on winter moth populations.

As of the second week in March 2012, here in MA, we cannot say for sure what the outcome will be this spring for winter moth damage to plants. However, it may be possible that winter moth eggs could hatch perhaps as early as the third week in March this year and that the host trees will still have very tight buds that will prevent the tiny caterpillars from entering, feeding and causing damage thus forcing the tiny caterpillars to starve. This speculation, if correct, may prove to be true only in some locations and not all, given the effects of localized climate that both winter moth eggs and host plants have been subjected to over the past winter months.

*For detailed information concerning the biology and management of Winter Moth, visit the following:*

<http://extension.umass.edu/landscape/fact-sheets/winter-moth-identification-management>

<http://extension.umass.edu/landscape/fact-sheets/winter-moth-overview>

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