

UPDATE ON WINTER MOTH IN NEW ENGLAND

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ABSTRACT

The winter moth, *Operophtera brumata*, a leaf-feeding geometrid native to Europe, has recently invaded eastern New England and is causing widespread defoliation. Previous invasions by this species in Nova Scotia and British Columbia have been suppressed by the introduction of two parasitoids from Europe, the tachinid *Cyzenis albicans* and the ichneumonid, *Agrypon flaveolatum*. As a result of these introductions, low-density populations of winter moth now persist indefinitely in these regions similar to those that exist in Europe. Over the past 4 years we have introduced *C. albicans* at six locations in Massachusetts and in 2007 we recovered the first parasitized larvae at our release site in Falmouth, MA. With the help of colleagues at the USDA APHIS laboratory at Otis Air Base, we are developing a mass rearing program for this tachinid and its winter moth host on artificial diet so that we can release large numbers of this parasitoid at many locations in the future. We focus our efforts on *C. albicans* because it specializes on winter moth and it is thought to be the agent primarily responsible for the decline of winter moth densities in Canada. We have established long-term monitoring plots where we will quantify densities of winter moth life stages and document parasitism before and after establishment of *C. albicans*.

We conducted a survey for winter moth across southern and eastern New England with pheromone-baited sticky traps beginning in November 2005. We expanded this

survey in 2006 and 2007 to include the entire Northeast from Pennsylvania to Nova Scotia. The traps attracted both winter moth and the North American congener of winter moth, Bruce spanworm, *Operophtera bruceata*. We used dissection of male genitalia to distinguish between these two species. In New England, we recovered winter moths at sites that stretched from eastern Long Island, southeastern Connecticut, all of Rhode Island, eastern Massachusetts, coastal New Hampshire, and southern coastal Maine. We caught winter moths in areas that were at least 100 km from any areas known to be defoliated by winter moths. Traps further west and north and south caught exclusively Bruce spanworm. We confirmed these identifications by sequencing the CO1 mitochondrial gene of specimens of these two species. This technique does not distinguish between possible hybrids of these two species. To accomplish this purpose we sequenced the nuclear gene G6PD. We have confirmed the presence of hybrids between these two species although they are not very abundant. The survey in 2007 showed that winter moth occurs in Nova Scotia but not interior areas of Maine or New Brunswick. We suspect that winter temperatures may prevent winter moth from invading these regions. Winter temperatures in Nova Scotia are very similar to those in southern New England. In 2008 we deployed pheromone traps in southern New England in the same locations we had sampled in 2005. Our purpose was to measure the rate of spread of winter moth over the 3-year period.