



WINTER MOTH—ADULT FEMALE



WINTER MOTH—ADULT MALE

## WINTER MOTH

(*Operophtera brumata*)

For many years, defoliation on the New England south shore was attributed to cankerworms, a native insect that periodically defoliates the area. Typically, cankerworm outbreaks last two to three years before natural factors cause their collapse. When this failed to happen, it was suspected that another species was responsible. Specimens submitted to experts were confirmed to be winter moths. Winter moths feed on many deciduous trees and shrubs including oak, apple, elm, maple, ash, crabapple, cherry, and blueberry.

## LOCAL HISTORY

The major caterpillar pest responsible for foliar destruction in deciduous trees is a newly introduced insect called the Winter Moth (*Operophtera brumata*). Winter moth is now established in much of Rhode Island and has been picked up in traps, at least, in southeastern NH, coastal Maine, one place in southeastern CT and out on Long Island. Massachusetts still appears to have the largest and most damaging populations of this pest.

## IDENTIFICATION (Winter Moth vs. Bruce Spanworm)

Two papers published provide illustrations and descriptions of the genitalia of winter moth and Bruce spanworm (Eidt *et al.* 1996, Troubridge and Fitzpatrick 1993). Characters described by Troubridge and Fitzpatrick for distinguishing the two species, such as a black dot on the hindwing of the Bruce spanworm [see photo left], are not reliable and are usually obscured on specimens that have been captured in sticky traps. Dissection of the male genitalia provides a means to differentiate the two species. After dissecting over a thousand potential winter and Bruce spanworm moths from the New England states, Jeff Boettner (Elkinton Lab-U-Mass) has found the distinction between the two species to be less clear cut than the published illustrations. He examined the “uncus” for three characters: 1) general shape, 2) measurement at the tip of the uncus and 3) measurement at the widest point of the uncus.



WINTER MOTH



BRUCE SPANWORM



WINTER MOTH DAMAGE

## INJURY & HOST PLANTS

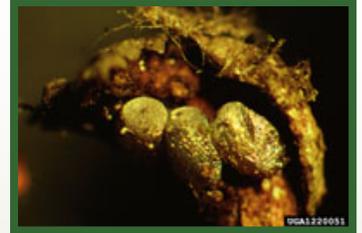
Many different deciduous plants are susceptible. These include: oaks, maples, cherries, basswood, ash, white elm, crabapples, apple, blueberry, and certain spruces such as Sitka spruce (Scotland), and heathers (England). Young larvae (caterpillars) wriggle into buds in the early spring just before or at bud break. Once inside the buds, the tiny caterpillars begin feeding. Delayed bud opening due to cool weather can lead to bud death. Larvae move from bud to bud as they feed. As the larvae grow, they feed in expanding leaf clusters and are capable of creating defoliation in high populations.

## LIFE CYCLE

Moths, the adult stage of Winter Moth, emerge from the soil usually in late November and may be active into January whenever the air temperatures are mild. The male moths are light brown to tan in color and all four wings are fringed with small elongate scales that give the hind margins a hairy or fringed appearance. The male moths are strongly attracted to lights and can often be found flying around outside lamps or holiday lights. The female is gray, almost wingless (brachypterous) and, therefore, cannot fly. She emits a sex pheromone that often attracts clouds of male moths. Females are usually found at the base of trees or scurrying up tree trunks, but can be found almost anywhere. After mating, the female deposits a loose egg cluster in bark crevices, under bark scales, under lichen, or elsewhere.

The adult moths then die and the eggs over-winter. Eggs are green at first but turn orange within 3-4 weeks. In March, just prior to hatching, they turn extremely dark. Eggs hatch when temperatures average around 55 °F. It is believed that egg hatch occurs when 20-50 Growing Degree Days (base 50) have accumulated, which can be anywhere from late March into April, depending on the year. This means that egg hatch occurs just at or right before bud break of most of the host plants. Some of the newly hatched larvae crawl up tree trunks and produce a silken strand of silk, which makes them air buoyant. This larvae dispersal method is known as “ballooning”. After hatching, the larvae wriggle between bud scales of newly swelling buds of such hosts as: maples, oaks, ash, apples, crabapples, blueberry, cherries, etc. and begin feeding.

Caterpillars feed on both flower and foliar buds. Once a bud has been devoured from within, the caterpillar will migrate to other buds and repeat the process. Destruction of the flower buds leads to greatly diminished harvest on fruit crops. After leaf buds open, the small caterpillars can be found within the tight clusters of new leaves during the day. Winter moth caterpillars often leave clusters to become free feeders at night. They may also drop or balloon and begin feeding on plants, like roses and herbaceous perennials that are located beneath or near infested trees. At maturity, the caterpillars will be approximately one inch long, whereupon they drop to the soil for pupation. Pupation occurs from late May into early June.



WINTER MOTH EGGS

Winter moth caterpillars are pale green caterpillars with a faint white longitudinal strip running down both sides of the body. They are “loopers” or “inchworms” and have just 2 pairs of prolegs. Winter moth caterpillars are often found in association with both the fall and spring cankerworms, which look and have similar feeding patterns to the winter moth caterpillar.



WINTER MOTH LARVAE (LOOPER)

## MANAGEMENT

Some products are available that act as a barrier to climbing caterpillars or for the climbing adult female moths in late fall to early winter. This method is known as “tree banding”. The products for tree banding are generally heavy weight paper or plastic strips that are covered with a sticky substance that snare climbing caterpillars (or female moths). However, research does not yet support their effectiveness for reducing winter moth caterpillar populations when in high numbers and they are not recommended for that purpose. In the states of Washington and Oregon, as well as Canada, various natural controls have been introduced to combat this pest, with varying levels of success. These include parasites such as flies and wasps. Certain native beetles, like carabids (ground beetles) and staphylinids (oil beetles) may act as predators of this pest.



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