

HOURLY AND SEASONABLE VARIATION IN CATCH OF WINTER MOTHS AND BRUCE SPANWORM IN PHEROMONE-BAITED TRAPS

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ABSTRACT

Elkinton et al. recently completed a survey of northeastern North America for the newly invasive winter moth, *Operophtera brumata* L. The survey used traps baited with the winter moth pheromone, which, as far as it is known, consists of a single compound that is also used by Bruce spanworm, the North American congener of winter moth, *O. bruceata* (Hulst). We developed DNA techniques to complement dissection of male genitalia to distinguish between the two species. In the broad zone where the two species co-occur, we found that that only 3/158 (1.9 percent) were unmistakable hybrids, based on sequences of the nuclear gene G6PD. We and others have found that it is quite possible to mate the two species in the laboratory. The continued co-existence of the two species after 70 years in Nova Scotia and the rarity of F1 hybrids in our survey suggest that there must be one or more barriers to hybridization. In this study we explore the possibility of one such barrier: that the two species might fly and mate at different times of day or have a different seasonal flight period. We deployed

pheromone-baited traps developed by Al Sawyer of USDA APHIS that recorded date and time of capture of each moth. We placed these traps on Staten Island, where we caught only Bruce spanworm, and in eastern Massachusetts, where we caught only winter moths.

We found that winter moths fly almost exclusively during the night. Peak flight typically occurs at dusk, but it will persist throughout the night as long as the temperature stays above freezing. Another peak often occurs at daybreak. On warmer nights there appeared to be three peaks of flight, at dawn, dusk, and near midnight. Not surprisingly, total number of males captured each night was positively correlated with nighttime temperatures ($P = 0.02$). In contrast, Bruce spanworm was captured in our trap on Staten Island exclusively during daylight hours. Peak flight occurred in early morning (7:00) and late afternoon (16:00) about an hour later and earlier, respectively, than peak flight for winter moth. These times represented the only periods of overlap between the two species.