

WEATHER, DISTANCE, SYNCHRONY AND MATE-FINDING SUCCESS IN *LYMANTRIA DISPAR*

D. R. Lance¹, A. Liebhold² and V. C. Mastro¹

¹USDA-APHIS-PPQ Otis Pest Survey Detection and Exclusion Laboratory
Bldg 1398, Otis ANGB, MA 02542

²USDA Forest Service, 180 Canfield St., Morgantown, WV 26505

ABSTRACT

Mark-recapture experiments were run from 2002 to 2004 to assess factors that influence capture of male gypsy moths, *Lymantria dispar* (L.), in traps baited with (+)-disparlure. Two plot designs were used. One was a center-release design: six and twelve traps were evenly spaced along two concentric circles with radii of 40 and 80 m, respectively, and moths were released at the center of the circles. The second was a center-trap design: males were released from 12 points around a single trap; i.e., at three distances in each of four cardinal directions. For the center-trap study, several combinations of release-to-trap distances were used (12.5, 25 & 50 m; 50, 100 & 150 m; 50, 150 & 250 m). Laboratory-reared males (NJSS strain) were marked with Day-Glo powder (and, if needed, Sharpie on forewing) and released on the day of emergence. For six replicates of the center-trap plot (all 50, 100 & 150 m), males were released on three consecutive days, but the trap was not put into place until just after the third day's release.

Overall, in the center-trap tests, 6476 males were released and 683 (10.5%) were captured. For the center-release tests, 4781 were released across 34 dates, and a total of 1055 (22.1%) were recovered. In the center-trap study, recapture fell from ≥ 20 percent or more for males released

at ≤ 50 m from the trap to ca. 5 and 1 percent from distances of 150 & 250 m, respectively. Capture declined from >12 percent of males released on the day the trap was put in place to 8 and <3 percent of males released 1 and 2 days before trap placement. Capture data from the center-release plots was analyzed against a number of weather-related variables. Several measures of temperature were significant when included as a covariate in the model; of those, Growing-Degree Days (base 10° C), when accumulated over days 1 and 2 after the release, provided the best fit ($F = 25.95$; d.f. = 1, 24; $P < 0.001$). Recapture was also significantly lower for trials in which rain fell on the day after release (treated as a fixed effect with two levels; i.e., rain or not; $F = 7.76$; d.f. = 1, 24; $P < 0.01$). Males tended to be captured in traps that were upwind from the release point; specifically, a regression of displacement of moths in the direction of the wind vs. length of the daily wind vector was significant ($r^2 = 0.27$; $F = 8.14$; d.f. = 1, 22; $P = 0.009$); crosswind displacement was not significant ($P = 0.36$). These results should be useful for developing models to: (1) improve estimates of the sensitivity of trapping grids for detecting gypsy moth populations; and (2) assess how mate-finding success might influence the establishment of incipient, isolated populations.