

The Effect of Various Doses of Pheromone on Mating Disruption in Gypsy Moth Population

*Ksenia Tcheslavskaja*¹, *Alexei A. Sharov*¹, *Kevin W. Thorpe*², *Carlyle C. Brewster*¹

¹Virginia Tech, Blacksburg, VA

²USDA Agricultural Research Service, Beltsville, MD

Abstract

An experiment was conducted in June-August 2001 in the Cumberland and Appomattox-Buckingham State Forests, Virginia to evaluate the effects of various doses of synthetic pheromone (racemic disparlure) on mating disruption of the gypsy moth, *Lymantria dispar* (L.). The pheromone was applied aerially in two formulations: a microcapsule formulation (3M Canada Co., London, Ontario) was applied at 0.15, 0.75, 3, 15, 37.5, 75 g a.i./ha, and pheromone in a plastic laminated flake formulation (Disrupt II, Hercon Environmental Corp., Emigsville, PA) was applied at a rate of 15 g a.i./ha. All doses were replicated twice, except for the 15 and 37.5 g a.i./ha doses of the microcapsule formulation, which were unreplicated. Mating disruption was evaluated using laboratory-reared tethered virgin females and the release and recapture of males with USDA milk-carton traps baited with (+) disparlure. Each study plot had two male moth release points with one at the center of the plot and the other at 175 m to the north. Fifteen tethered females were placed in a circle around the central release point. One trap each was placed 150 m to the south, east and west of the central release point and four traps were placed around the northern release point at a distance of 25 m from the point. Adult females were placed on tree boles for 1 day and protected from ant predation by a band of the tanglefoot glue. Fertilization was determined by the analysis of egg embryonation. Male moth recapture in pheromone traps was studied over three periods: 15-45, 50-62 and 64 days after pheromone treatment. The proportion of fertilized females was significantly lower in plots treated with the plastic flake formulation at 15 g a.i./ha and the microcapsule formulation at 15, 37.5 and 75 g a.i./ha ($P < 0.01$) than in plots treated with lower doses of pheromone and in control plots. Male moth catches in pheromone-baited traps were significantly lower in plots treated with the plastic flake formulation at 15 g a.i./ha and the microcapsule formulation at 37.5 and 75g a.i./ha ($P < 0.01$) compared to male moth catches in all other plots. However, male moth recapture rates at 64 days after pheromone application were significantly lower on the plots treated with plastic flakes than on the plots treated with any of the doses of pheromones in the microcapsule formulation. As a result of this study, the dose-response relationship among pheromone dose, female mating success, and male moth catch in pheromone traps was obtained for a range of pheromone doses. The results also suggest that the plastic flake formulation may have a longer lasting effect on mating disruption of gypsy moth than the microcapsule formulation.