

DISPERSAL OF GYPSY MOTH PATHOGENS INTO AREAS NEWLY COLONIZED BY GYPSY MOTH

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ABSTRACT

As gypsy moth colonizes new areas, the fungal and viral pathogens infecting larvae also disperse into new gypsy moth populations. Our study addresses spatial and temporal conditions associated with pathogen dispersal to answer questions about predictability of pathogen dispersal. Larval pathogens were investigated along the edge of gypsy moth spread in central to southwestern Wisconsin in 2005 and 2006. Each year, in six intensive sample sites, we collected larvae and cadavers from the field, we caged larvae at these sites and, in the laboratory, we exposed larvae to field-collected soil. During the field season, we added appropriate sites but only some of these procedures were used at the added sites.

The most sensitive sampling method for detecting pathogens was collecting larvae in the field and rearing them, but this method required dense enough populations so that larvae could be found. In 2005, the majority of intensive sample sites were in areas with <30 male moths per pheromone trap the previous year; few gypsy moth larvae were found and, among caged larvae, very little infection occurred. In 2005, *Entomophaga maimaiga* infections were found in three of nine total sites, with

NPV present at two sites. In 2006, intensive sample sites were located in areas with 3 to >100 male moths per pheromone trap; more larvae could be collected and more infection by both pathogens was found. *E. maimaiga* infections were found in 6 of 12 sites, with NPV at 5 of the sites. For both years, *E. maimaiga* infections were usually more abundant than NPV infections when the pathogens co-occurred. There was a clear association between distance from the nearest quarantined county and presence and percent infection of pathogens. No infections were found in 2005 sites with very low density gypsy moth populations (< 1 male moth/trap). The only sites outside of quarantined counties where we found pathogens were locations with >10 male moths/trap the previous year where larvae could easily be collected. Within quarantined counties, where gypsy moth populations were generally more abundant, pathogens were usually, but not always, found. In one instance demonstrating the variability within quarantined counties where gypsy moth populations are present but frequently not abundant, sites in Madison within 2 km of each other and hosting very different gypsy moth densities also differed in whether pathogens were present.