

GEORGE MERCER AWARD



Joseph S. Elkinton

The George Mercer Award is given by the Society to a young author or authors in recognition of an outstanding paper in ecology. The recipients for 1998 are Greg Dwyer, Joseph S. Elkinton, and John P. Buonaccorsi for their 1997 paper entitled, "Host heterogeneity in susceptibility and disease dynamics: tests of a mathematical model," which appears in *The American Naturalist* 150:685-707. Dwyer et al. provide a rigorous test of a fundamental assumption of many disease models, the notion that horizontal transmission depends linearly on the densities of healthy and infected individuals. Using models, as well as laboratory and field experiments, they demonstrate that transmission of a nuclear polyhedrosis virus in gypsy moths is a nonlinear function of virus density, an apparent consequence of variability in host susceptibility. The authors then demonstrate that incorporating heterogeneity in host susceptibility into models gives a much better fit to experimental field results than do classical, linear models. The paper provides an excellent example of the use of models to provide a broad context for a research project, as well as the use of experimental results in model refinement.

Dwyer et al. compared viral susceptibility between two populations

of gypsy moths: one a composite of individuals drawn from populations from three states, the other bred in the laboratory for over 40 generations. Based on results of dose–response experiments, the authors hypothesized that the feral populations would show more variability in susceptibility to the virus than would laboratory populations. The results of field experiments generally supported this hypothesis. A particularly laudatory aspect of the research was the fact that the dose–response experiments were conducted across three spatial scales.

Results of this work are not only relevant to understanding host–disease dynamics, but also touch upon two themes of much current ecological research: the influence of heterogeneity and scale on ecological processes. In addition, the paper represents a stellar example of how one can use models to understand nature and how one can test the validity of laboratory experiments in the field.

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Greg Dwyer



John P. Buonaccorsi