

## ENTOMOPHAGA MAIMAIGA PANZOOTIC IN NORTHEASTERN GYPSY MOTH POPULATIONS

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### ABSTRACT

The fungal pathogen causing extensive mortality in gypsy moth larval populations during the 1989 field season has been identified as *Entomophaga maimaiga*. Identification was based on morphology and *in vitro* culture requirements, as well as results from allozyme and restriction fragment linked polymorphism analyses. *E. maimaiga* is well known to cause spectacular epizootics in Japanese gypsy moth populations but has not been reported from North America previously.

*Entomophaga maimaiga* was found in 7 contiguous states in the northeastern U.S. during late June and early July. Populations of late instar larvae in central Massachusetts sustained 60-88% mortality due to *E. maimaiga* in four forest stands. It is important that at the time of the panzootic, gypsy moth populations were increasing in the northeast and *E. maimaiga* caused significant mortality in low level as well as more abundant populations. In contrast, the commonly occurring nucleopolyhedrosis virus (LdMNPV) generally causes epizootics only in outbreak populations. The *E. maimaiga* panzootic was associated with high levels of May and June rainfall. We hypothesize that lack of adequate rainfall limited appearance of this pathogen in northern VT, NY, and NH. However, it is clear that *E. maimaiga* is not coextensive with the gypsy moth; in the southern and western areas of the gypsy moth distribution, which gypsy moth populations have colonized more recently, rainfall was abundant but *E. maimaiga* did not occur.

It is most likely that the presence of *E. maimaiga* in North America is due to biological control introductions made in 1910 and 1911 in the Boston area. This fungal pathogen may have escaped detection over the past 78-79 years, as it increased in distribution because (a) cadavers are similar in appearance to cadavers of LdMNPV-killed larvae, and (b) it is probable that this pathogen is not a major mortality factor every year. In conclusion, this panzootic had several major impacts: 1. extensive larval and pupal mortality occurred, 2. in many areas, defoliation was prevented, 3. large numbers of resting spores (the overwintering stage of *E. maimaiga*) were deposited in the environment, and 4. with the extensive activity of *E. maimaiga* in the northeast, there is great potential that this fungus increased in distribution even further.