# *Graphania mutans* (Walker) and *Acremonium lolii* (Latch)

# The Relationship Between an Insect Herbivore and a Fungal Endophyte of Perennial Ryegrass.

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## ABSTRACT

In examining the relationship between *Graphania mutans* (Walker) (Lepidoptera: Noctuidae) and perennial ryegrass infected with the fungal endophyte *Acremonium lolii* (Latch in press), the biology of *G. mutans* was investigated. Two types of larval development are identified: 'fast-track' larvae develop more rapidly through fewer instars and grow much larger than 'slow-track' larvae when reared on both artificial diet and perennial ryegrass. The complexity of *Graphania* speciation is discussed.

The presence of endophyte is shown to confer on perennial ryegrass resistance to *G. mutans* larvae in the laboratory, with strong antixenosis and possible antibiosis effects exhibited. Feeding preference tests show that neonate and sixth instar fast-track larvae significantly prefer excised endophyte-free ryegrass to endophyte-infected leaves. The effects of endophyte on the development of fast-track and slow-track larvae are to decrease larval weight, head capsule width, and the number of successful pupations.

The same methods were used to determine the effects of peramine (an antifeedant compound for Argentine stem weevil extracted from endophyte-infected perennial ryegrass) on fast-track *G. mutans* larvae. Incorporated into artificial diet at 10ppm, peramine has no affect on neonate and sixth instar larval feeding preference. Peramine does affect larval development, causing reduced larval weight, delayed pupation, and increased mortality.

The role of peramine in endophyte-induced resistance, and the possible adaptive significance for perennial ryegrass of endophyte infection is considered. The interactions between *G. mutans*, endophyte and perennial ryegrass within the pasture ecosystem are discussed, and suggestions and hypotheses presented for future investigation.

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