

**INABILITY OF THE LONE STAR TICK, *AMBLYOMMA AMERICANUM* (L.), TO RESIST DESICCATION AND MAINTAIN WATER BALANCE FOLLOWING APPLICATION OF THE ENTOMOPATHOGENIC FUNGUS *METARHIZIUM ANISOPLIAE* VAR. *ANISOPLIAE* (DEUTEROMYCOTA)**

**Jay A. Yoder<sup>1,3</sup>, Jacob T. Ark<sup>1</sup>, Joshua B. Benoit<sup>2</sup>, Eric J. Rellinger<sup>1</sup> and Justin L. Tank<sup>1</sup>**

1. Department of Biology, Wittenberg University, Springfield, OH 45501, USA; 2. Present address: Department of Entomology, The Ohio State University, Columbus, OH 43210, USA; 3. Author for correspondence (e-mail: jyoder@wittenberg.edu).

**ABSTRACT** - We report that female lone star ticks (*Amblyomma americanum*) experience a rapid change in water permeability when treated with the entomopathogenic fungus *Metarhizium anisopliae*. The amount of water loss is nearly double the rate of control ticks not exposed to this fungus. As a result, ticks are prevented from stabilizing body water levels (water gain  $\neq$  water loss) at hydrating atmospheres greater than the critical equilibrium activity (CEA) of  $0.85a_v$ - $0.93a_v$  ( $a_v = \% \text{RH}/100$ ) and reach their dehydration tolerance limit in less time. Thus, disruption of water balance is a pathogenic consequence of fungus infection. This served as a benchmark for evaluating effects on ticks of frequently encountered soil molds in nature (wild tick isolates), *Aspergillus niger*, *Cladosporium cladosporioides*, *Penicillium glabrum* and *Scopulariopsis brevicaulis*. In contrast to *M. anisopliae* treatment, no effect on tick water balance was noted with topical application of *C. cladosporioides*, but water loss rates of ticks following treatment with *S. brevicaulis* fell between both extremes. Water loss rates imply that *P. glabrum* may be a tick pathogen, whereas *A. niger* is apparently not able to use ticks as a substrate. Enhanced desiccation arising from these common molds shows the importance of local mycoflora as natural regulators of tick populations. Water loss rates also provide a tool to assess the pathogenicity of different fungal strains targeted for application in the biological control of ticks.

**Key words** - Water balance, tick, fungi, *Amblyomma americanum* (L.), *Metarhizium anisopliae* (Metsch.).

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Internat. J. Acarol. 32(2): 203-209.