

Effect of Melatonin on the Larval Life Cycle of the Velvetbean Caterpillar, *Anticarsia gemmatalis*, and the Tobacco Hornworm, *Manduca sexta*

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Abstract

- Study the effects of melatonin treatment in insects
- Performed four different experiments with larvae
- Melatonin concentrations: 4.0×10^{-5} M and 4.0×10^{-4} M
- Velvetbean caterpillar may respond to melatonin depending on method of treatment

Introduction

- The function of the hormone melatonin remains unclear in insects
- Melatonin may lower weight gain, increase development time, delay time to pupation, and increase mortality

M. sexta:



<http://www.hmrprint.com/helensphotos/images/CATERPILARS/CATERP1A.jpg>

A. gemmatalis:



<http://www.ars.usda.gov/sp2UserFiles/Place/64021000/velvetbean3.jpg>

Methods

- Rearing conditions: 29°C, 67% RH, 14:10 light:dark cycle
- **Experiment 1, *A. gemmatalis*.** Solubilized melatonin in 0.4% ethanol and mixed into diet: 100% mortality in larvae
- **Experiment 2, *A. gemmatalis*.** Pipetted melatonin solutions near larval head for ingestion
- **Experiment 3, *A. gemmatalis*.** Pipetted melatonin solutions onto integument of larvae
- **Experiment 4, *M. sexta*.** Injected melatonin solution directly into larvae using a 10 μ L, 33-gauge needle
- n = 15 for each experimental group

Results

Figure 1. Experiment 2, *A. gemmatalis*

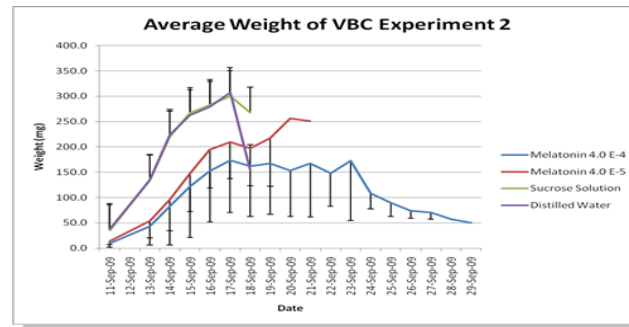


Figure 2. Experiment 3, *A. gemmatalis*

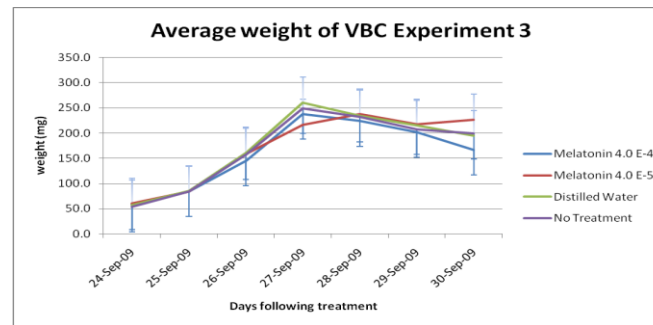
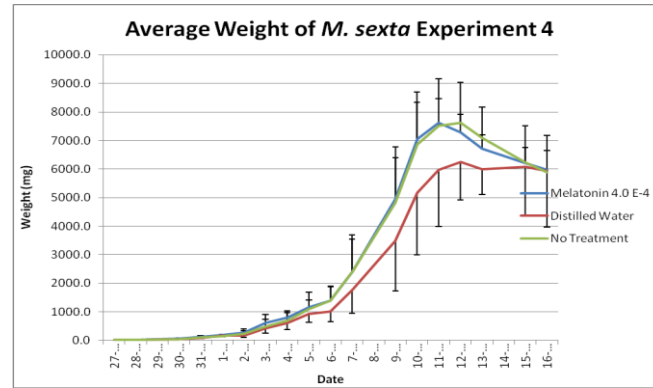


Figure 3. Experiment 4, *M. sexta*



Discussion

- Ingestion of melatonin may retard larval growth, delay pupation, and increase mortality
- Topical application of melatonin → no effect
- Injection of 2.7 nmol/g melatonin → no effect
- Future studies may vary melatonin concentration, use larger sample size, and other injection method



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