

# Cypermethrin Bioassay 1

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This first bioassay tests for toxic effects of DemonMax (23.3% cypermethrin) to third instar CRB grubs.

## 1 Methods

Third instar CRB grubs were field collected from a compost pile on February 14, 2011 and the experiment was set up at 1600 h that afternoon. Each grub was placed in a Mason jar containing 300 ml of steer manure/top soil blend. A 30 ml aliquot of DemonMax (25.3% cypermethrin) was poured in each jar to simulate a drench treatment. Five jars each were treated with 0%, 0.01%, 0.1%, and 1% dilutions of DemonMax concentrate in water. Observations were made at 24 h, 48 h, and 7 d. Each grub was scored as active, moribund, or dead.

## 2 Results

All grubs treated with a drench of 0.01%, 0.1%, and 1% DemonMax migrated to the surface of the steer manure/soil blend within a few hours of treatment (Fig. 1). In the experimental control jars, treated only with water, the grubs remained buried as is their usual behavior.

At the 24h and 48h observation times, all grubs treated with 0.01%, 0.1%, and 1% DemonMax were knocked down (either dead or moribund). However, at the 7 d observation time, all five beetles which had been scored previously as

moribund had recovered and were active beneath the steer manure/soil surface (Fig. 2).

### **3 Discussion**

The activity of pyrethroids, such as cypermethrin, is characterized by rapid knockdown. However, insects may recover after several days and resume normal activity. Recovery from knockdown was observed in this experiment: after an initial 100% knockdown, four of five beetle grubs recovered with jars treated with 0.01% DemonMax and one of five recovered in jars treated with 0.1%.

One hundred percent mortality was obtained only at the highest concentration, 1% DemonMax in water. Note that 0.1% is the recommended dilution on the label for this product. At this dilution, 20% (one of five) grubs survived. Efficacy for controlling CRB adults is unknown.



Figure 1: Behavioral response of third instar CRB grubs to simulated cypermethrin drench. At 20 h after treatment, all grubs treated with cypermethrin were on the surface of the steer manure/top soil blend. In comparison, all grubs in the jars treated with only water were buried as is their normal behavior. All jars were drenched with 30 ml aliquot per 300 ml substrate, top row: water only, 2nd row: 0.0025%, 3rd row: 0.025%, 4th row: 0.25%

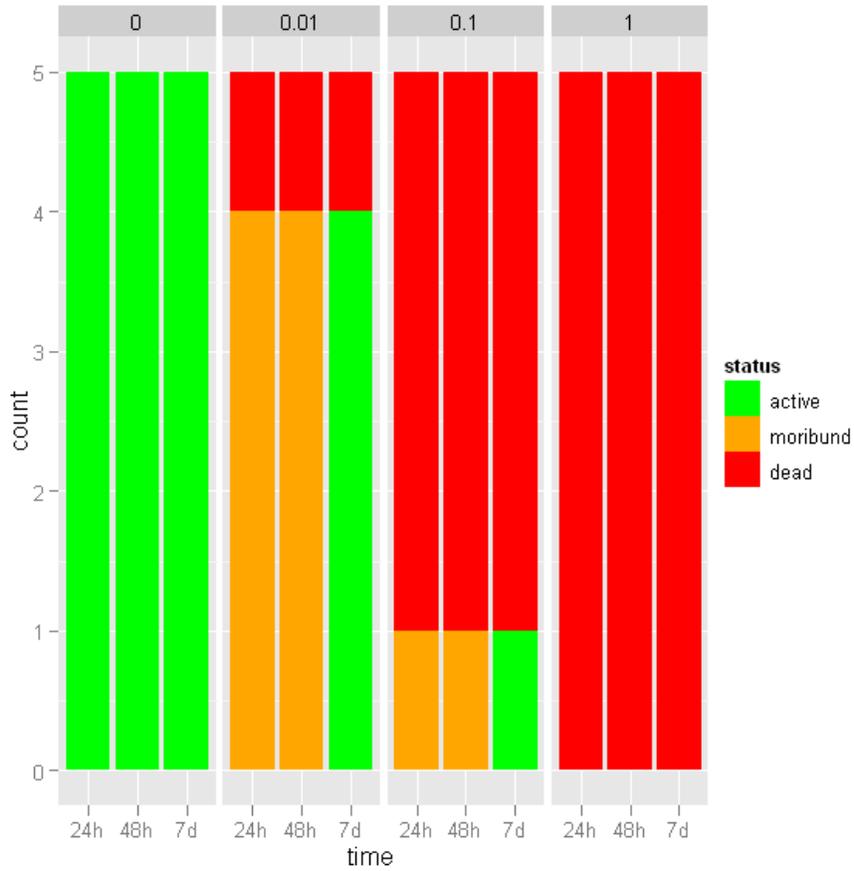


Figure 2: Efficacy of simulated drench treatments of DemonMax for third instar CRB grubs. Mason jars containing 300 ml of steer manure/top soil blend were drenched with 30 ml aqueous aliquots of 0, 0.01%, 0.1%, and 1% DemonMax concentrate. Observations were made at 24 h, 48 h, and 7 d. Each beetle was scored as being active, moribund, or dead.