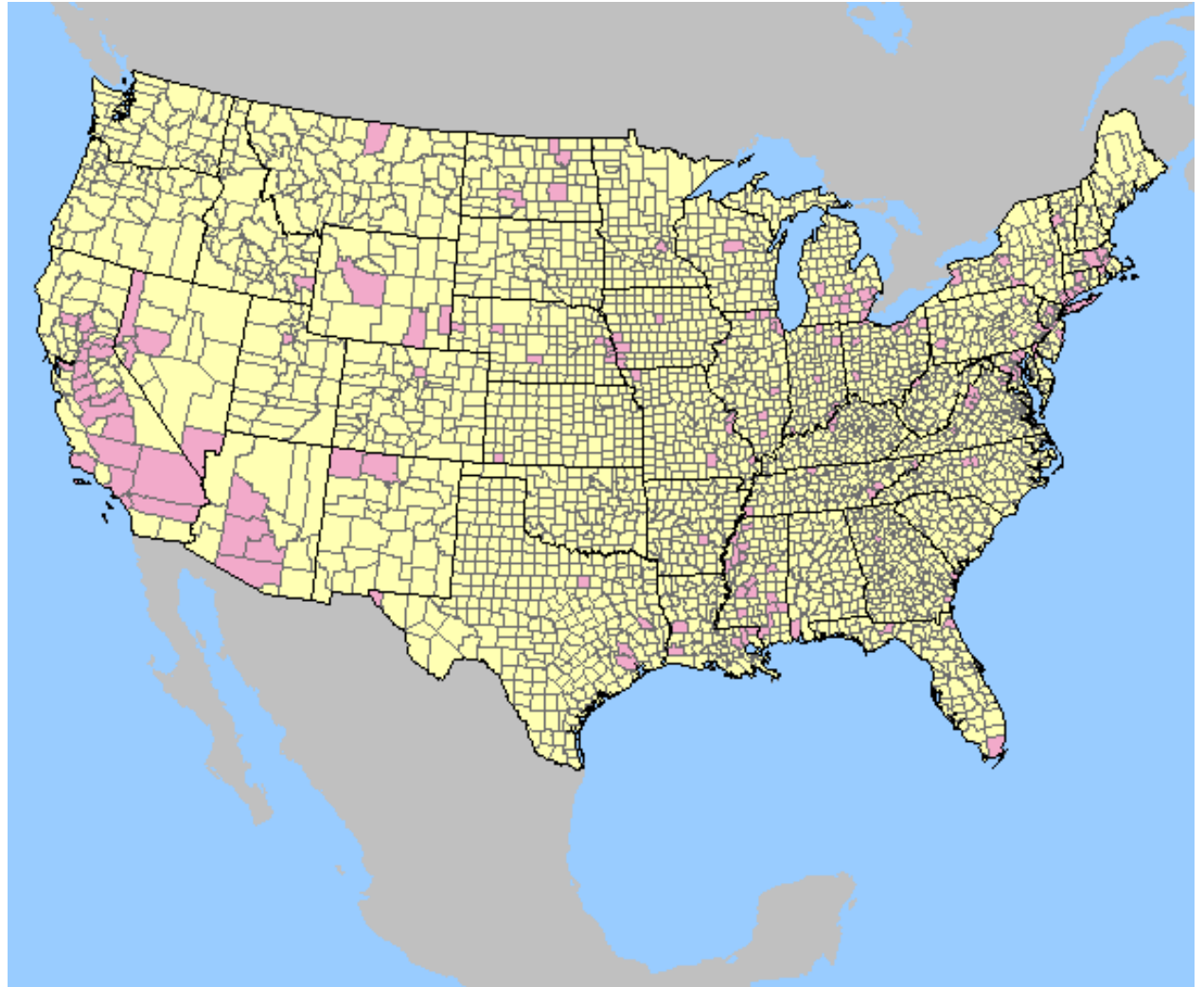


The Effects of Bifenthrin Barrier-Treatments on Non-Target Arthropods

Ryan Bare

Introduction

- WNV a continuing concern
- Largest arboviral encephalitis outbreak in US history



- Current conditions have opened up a market for pest-management professionals
- Larvicides, Habitat Assessment, Automatic-Misting Systems, and Barrier-Treatments



- Barrier-Treatments Effective Against:
 - Sand flies (Kelly et al., 1997)
 - Biting Midges (Royal, 2004)
 - Mosquitoes (Trout et. Al, 2007)



Growing Public Concern

- Could using insecticides be more harmful than the diseases they are attempting to control?
- How has this been investigated?
 - Honey Bees (Hester et al. 2001)
 - Crickets (Tietze et al. 1996)
 - Aquatic Insect Larvae (Siegfried 1993)
 - *Daphnia* and *Ceriodaphnia* (Milam et al. 2000)

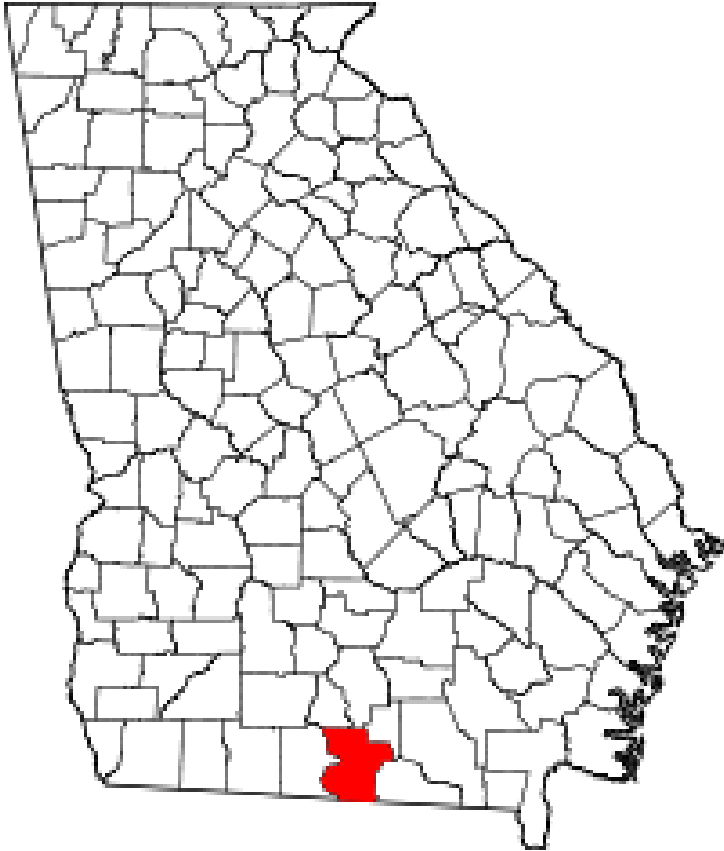
Purpose of this Study

- Research performed on barrier-treatment efficacy, but far less on non-target effects.
- No significant effect on community structure (Davis and Peterson, 2008)
- To measure the ecological, acute and chronic effects of bifenthrin barrier-treatments on non-target arthropods in contained and field environments.

Questions

- What are the effects of bifenthrin barrier-treatments on non-target arthropods?
 - Monitor community structure
 - Isolate one species
 - Verify efficacy on mosquitoes

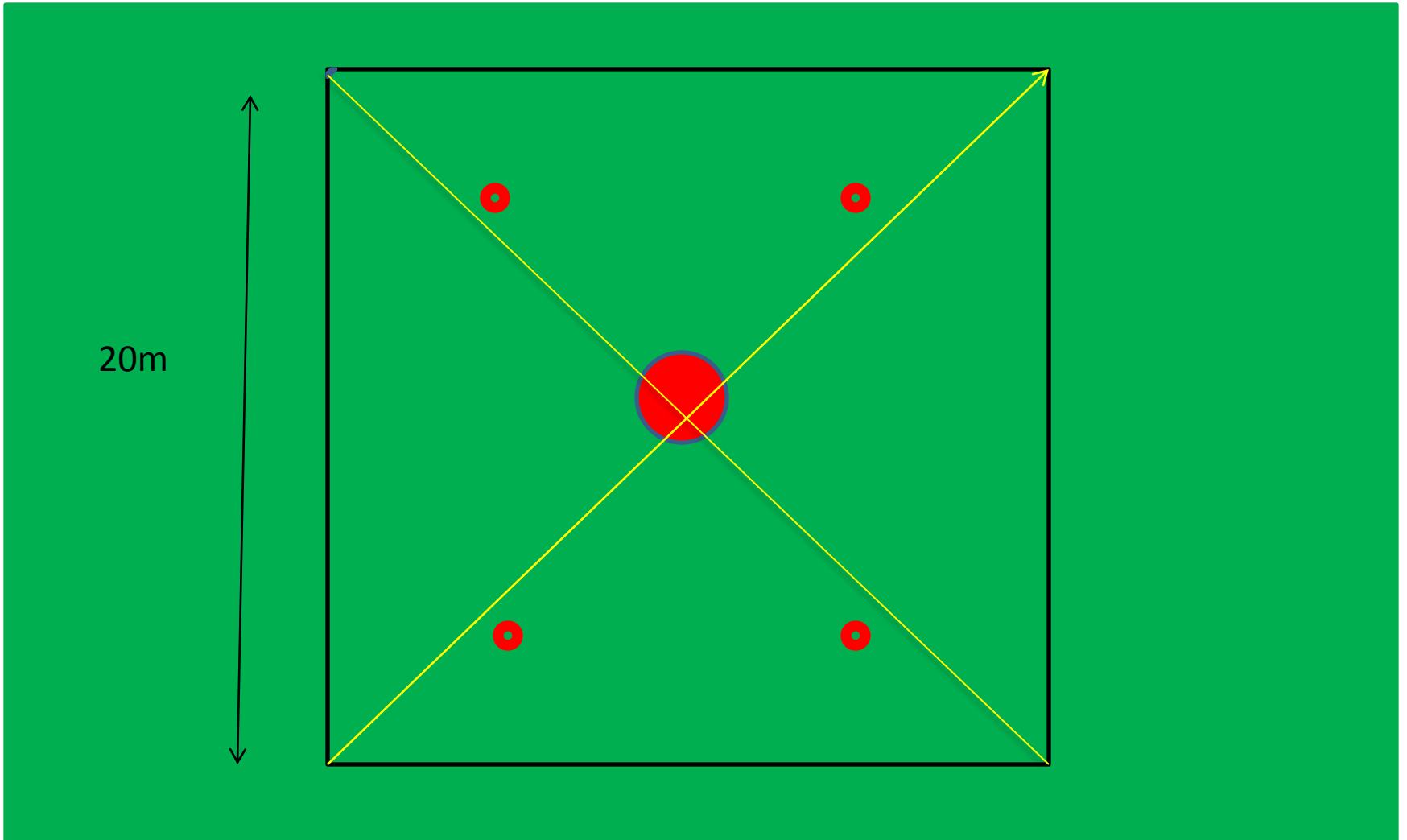
When and Where?



- Western Lowndes County, Ga
- Study began on 08/08/2011 and will end on 11/08/2011

- <http://maps.google.com/maps?hl=en&ie=UTF8&ll=30.811504,-83.400135&spn=0.009122,0.013711&t=h&z=16&vpsrc=6>

Site Setup



Site 1

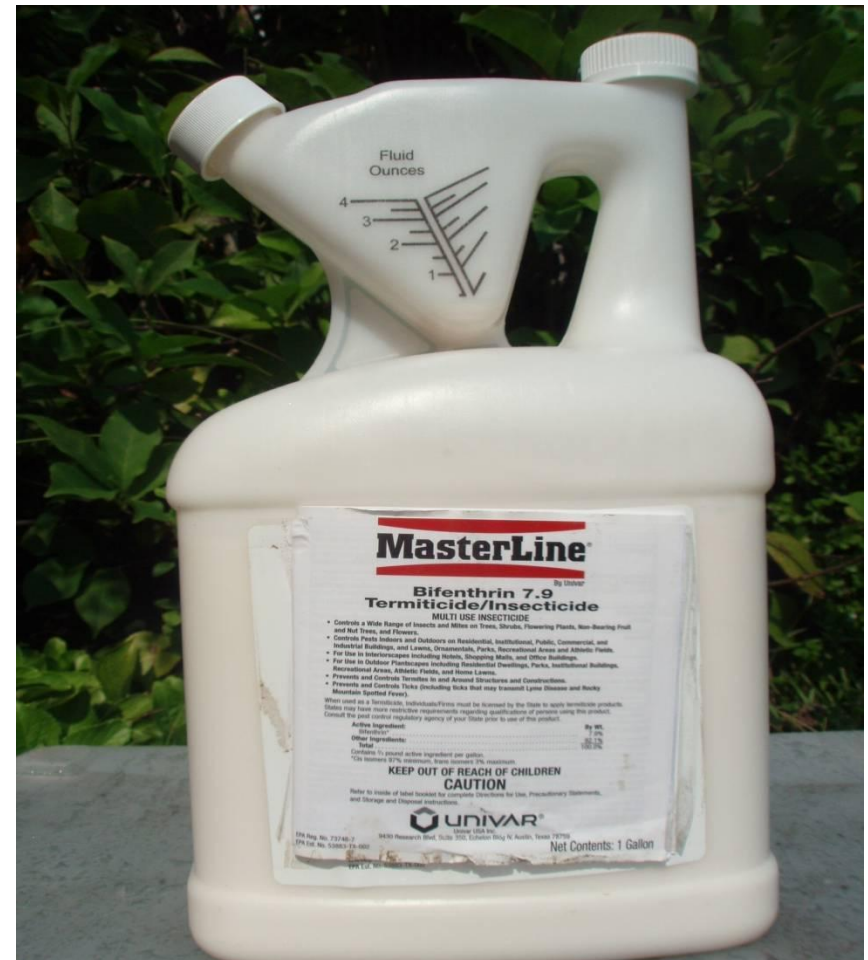


Site 2



Chemical Used

- Masterline Bifenthrin 7.9
- .75 ounce diluted into one gallon of water
- Dilution performed by another grad student
- One gallon of solution applied to every 1000 square feet.





- Maruyama Power Mist Duster MD150DX
- Flow rate gauge set to 1, producing 30-40 droplets of spray per square cm
- Spray rate verified with Syngenta water-sensitive paper

Pesticide Application

Plots are sprayed with one of two treatments

- Water
- Bifenthrin diluted in water at .75 ounces per gallon

Plots were arbitrarily assigned either the letter A or B in alternating order

Experiment double blinded

Collection Methods



Enclosure Setup

-Megaview
Bug Tent

-Potted Daisies

-Coccinellidae

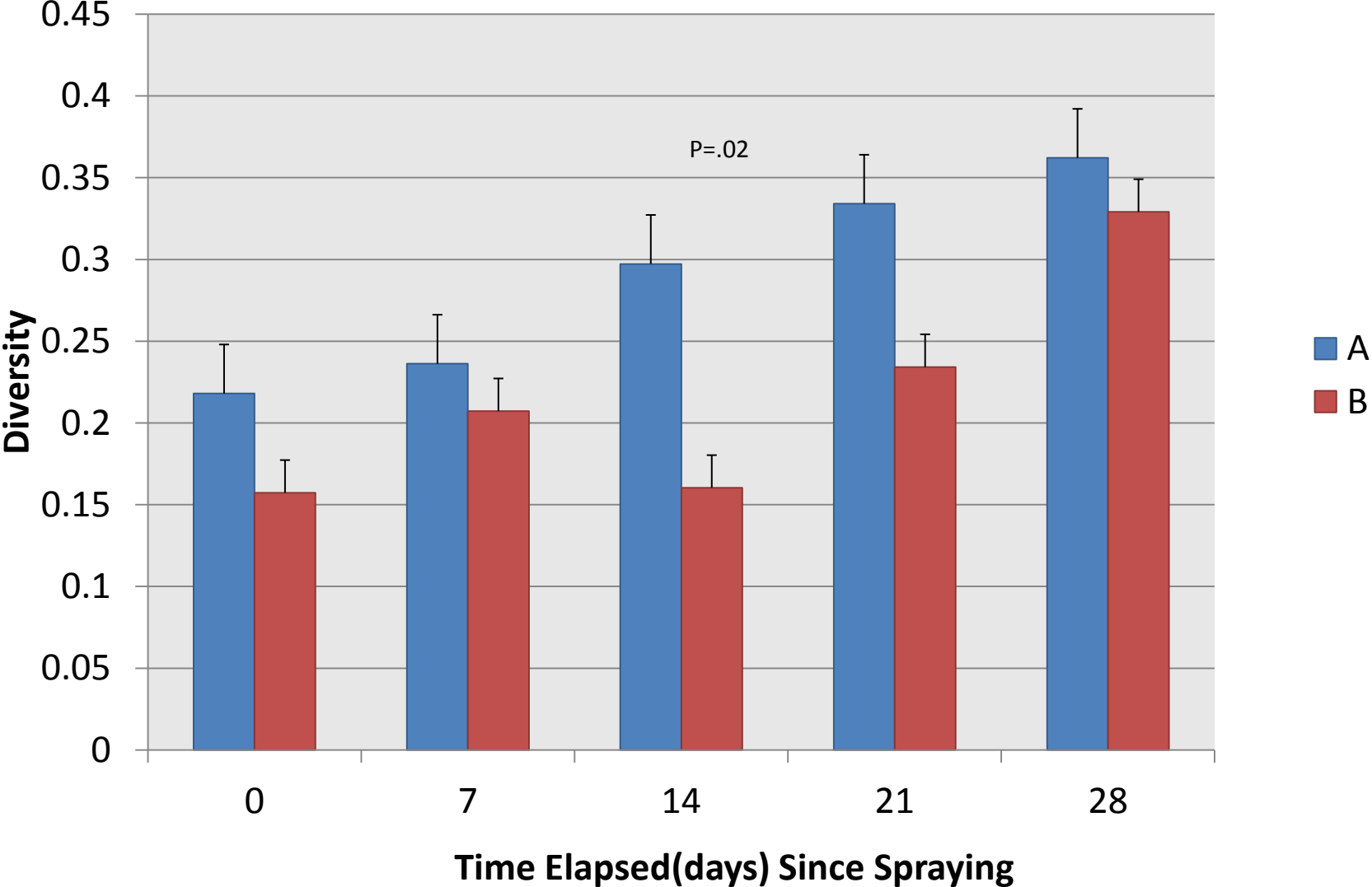


Mosquito Trapping

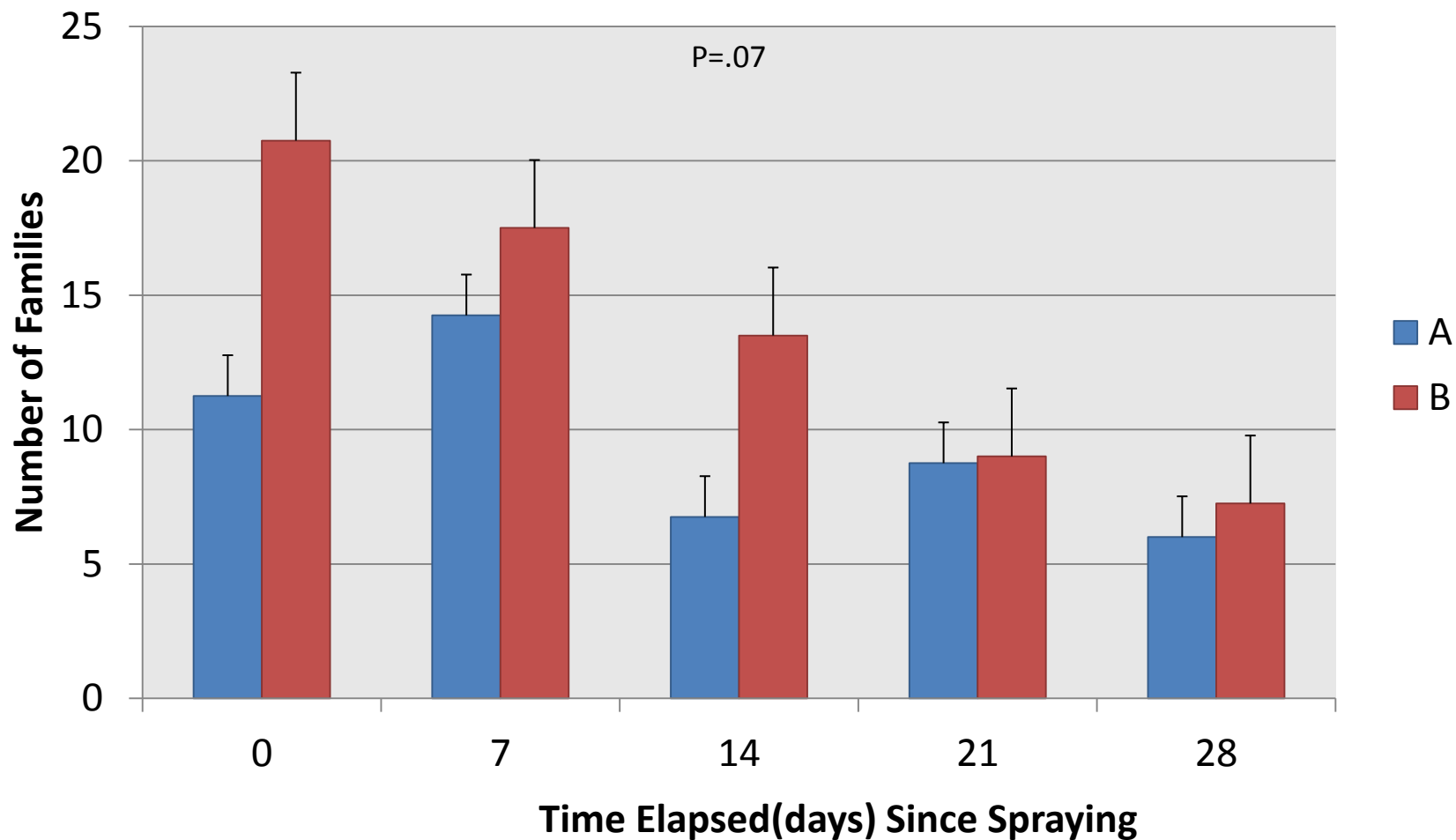


- CO₂ baited CDC light traps
- Site sampled the day prior to spraying and every seven days after.

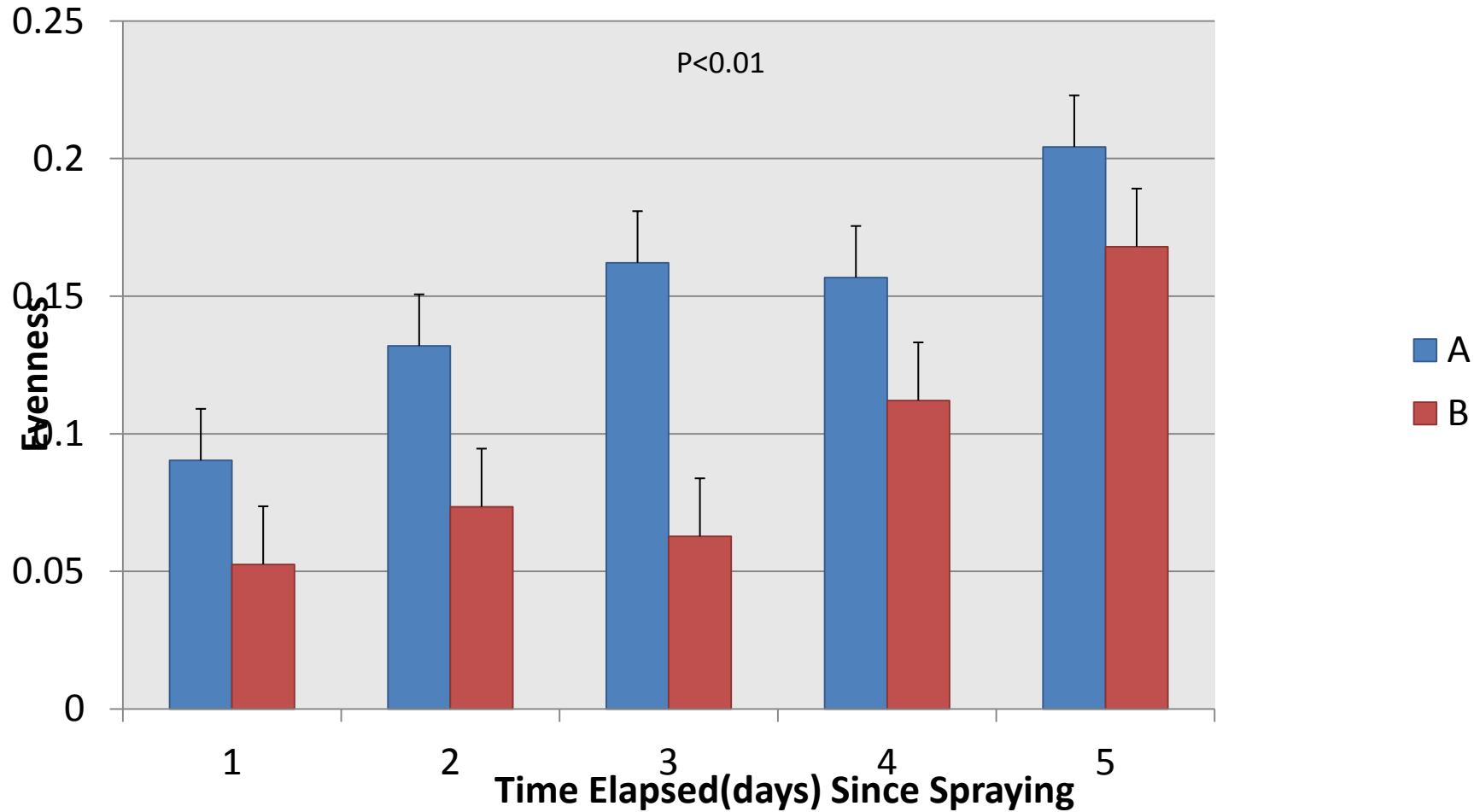
Average Diversity of Treatments Over Time



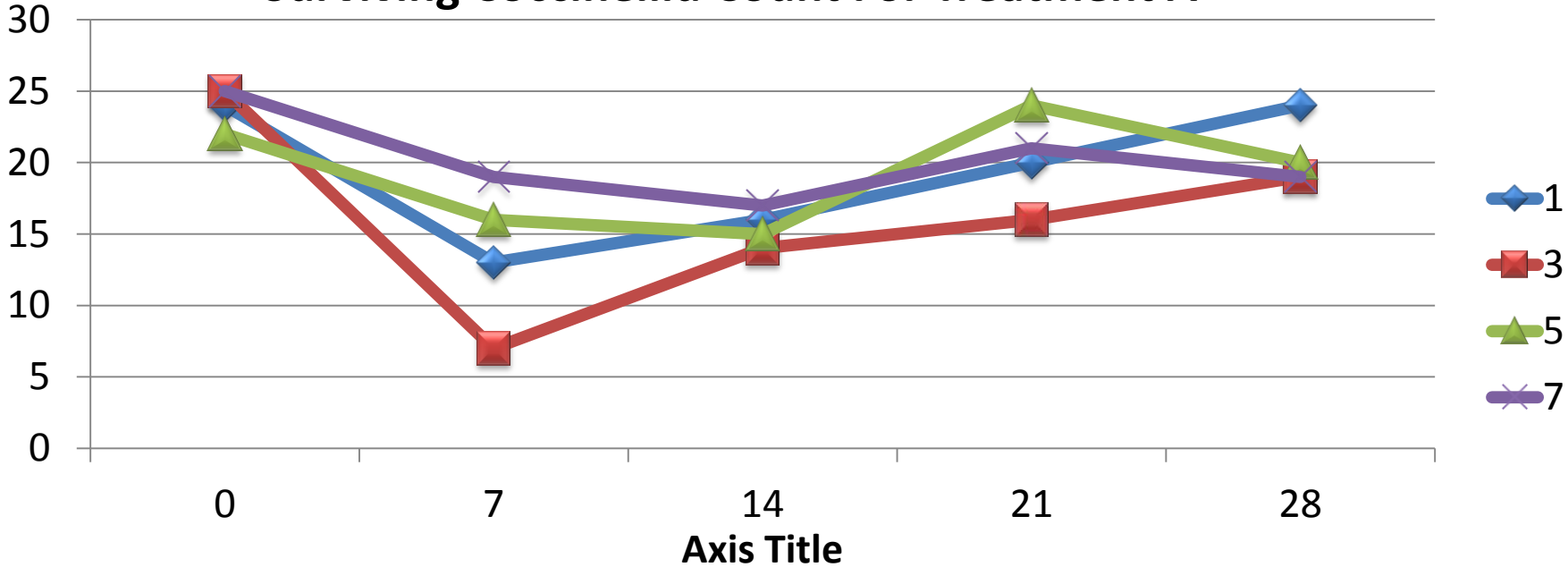
Average Richness of Treatments Over Time



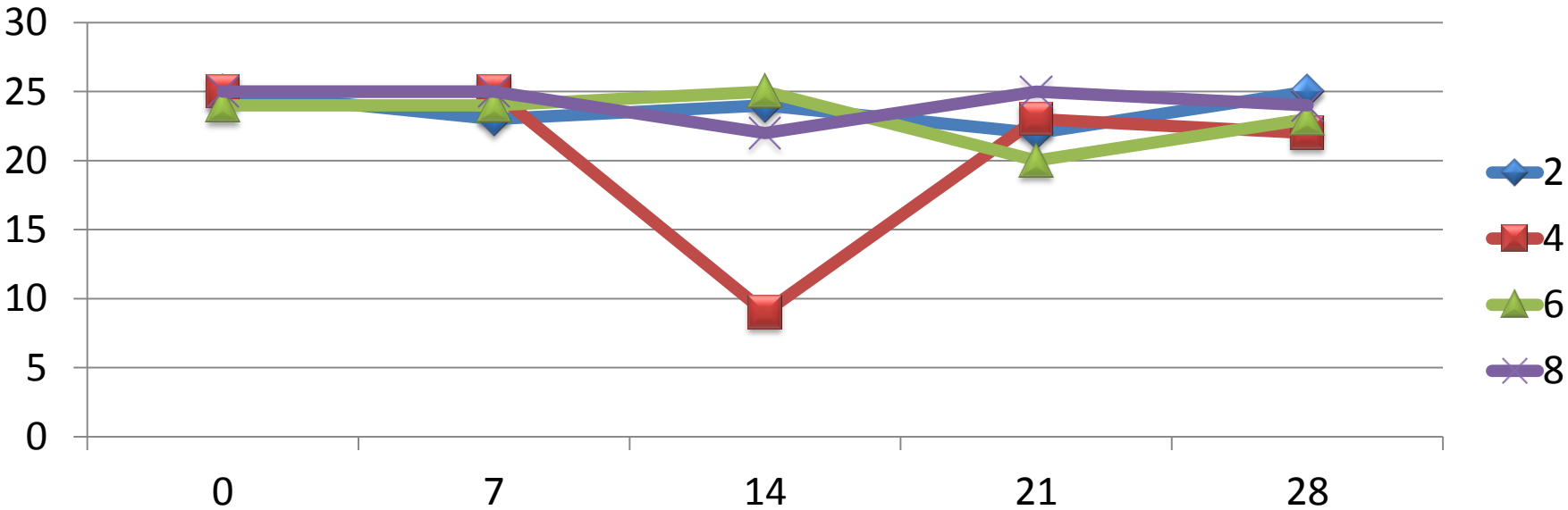
Average Evenness of Treatments Over Time



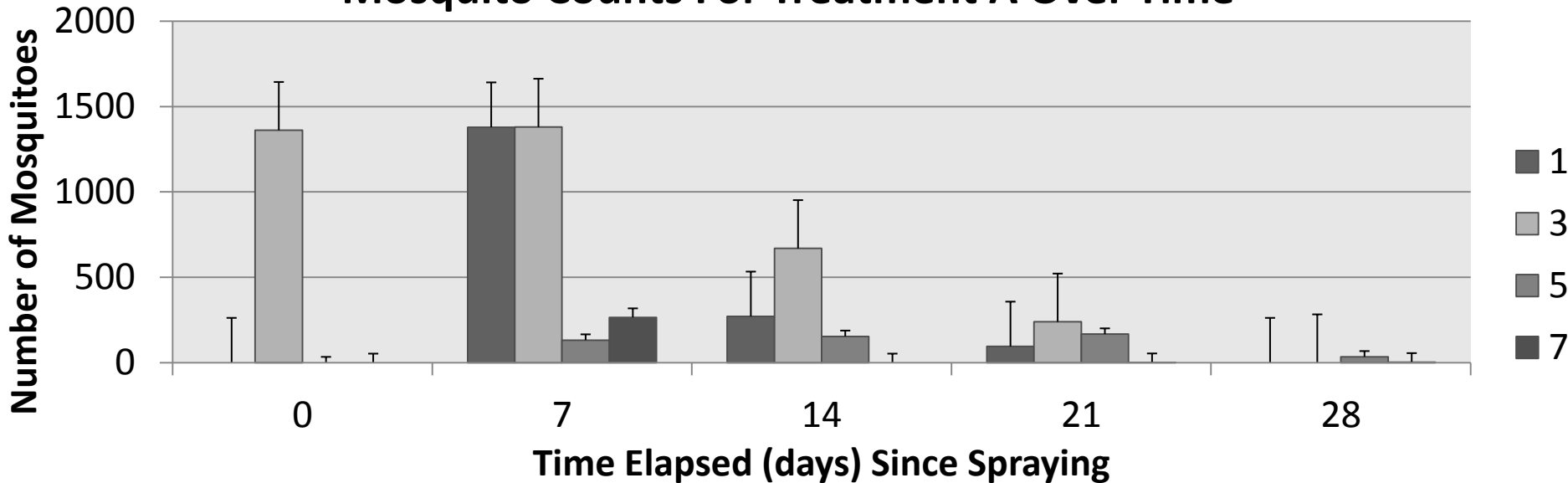
Surviving Coccinellid Count For Treatment A



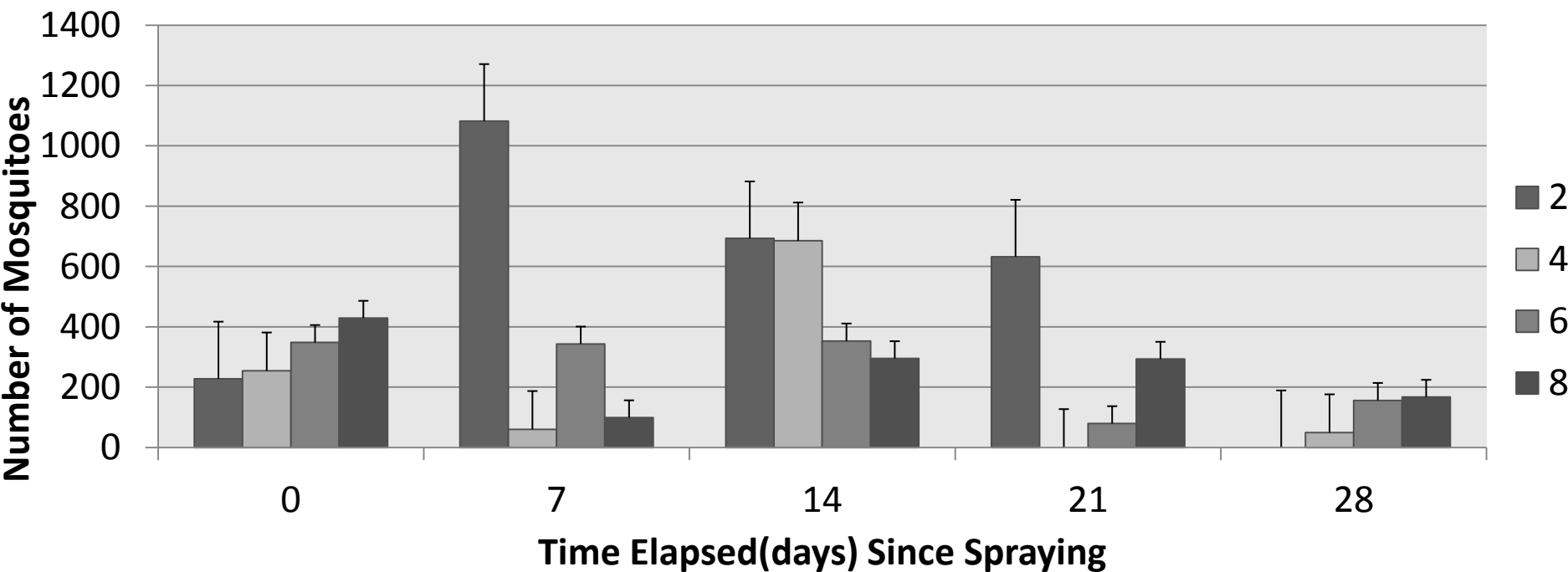
Surviving Coccinellid Count For Treatment B



Mosquito Counts For Treatment A Over Time



Mosquito Counts For Treatment B Over Time



Upcoming Addition to Thesis

- Aquatic Toxicological Studies
 - LOEC
 - NOEC
 - LC50
 - EC50



Acknowledgements

- Mosquito Lab Technicians: Anna-Beth, Alyssa Peacock, Lauren Smith, and Meridith Holton.
- Joe Andrews and UNIVAR
- My advisor Dr. Mark Blackmore
- Special Thanks to Dr. Ian Brown

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