

Evaluation of Barrier Sprays in Eastern North Carolina

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Abstract

Suspend® Polyzone® (deltamethrin) and Bifen Insecticide/Termiticide (bifenthrin) were evaluated in two eastern North Carolina neighborhoods from May 18 – Oct 19, 2015 (23 weeks). Lots were sprayed every 21 days. At 17 fixed locations (13 treatment, four control), Centers for Disease Control and Prevention (CDC) CO₂-baited traps were deployed overnight, once/week. Oviposition traps were also deployed weekly and remained for seven days to measure *Aedes albopictus* abundance. Mosquitoes were identified to species and tabulated by location and week. Adult and egg abundance was generally significantly higher in control versus treatment traps. The abundance of *Psorophora columbiae* and *Ae. vexans* was significantly higher in control versus treatment traps. Bifenthrin and deltamethrin showed differences in efficacy (e.g. *Ae. vexans*, *An. punctipennis*, and *Ps. ferox* abundance was higher in bifenthrin traps compared to deltamethrin and control traps), but this varied across neighborhoods and species.



Introduction

- Nuisance mosquitoes and the increasing threat of arbovirus transmission in the United States makes mosquito control an essential aspect of public health protection
- Limited field studies have shown differences in effectiveness of barrier sprays against some mosquito species and further evaluations are needed
- Bifenthrin and deltamethrin are insecticides used in outdoor barrier sprays to combat mosquitoes and other insects

Objectives

- 1) Compare the effectiveness of Suspend® Polyzone® (deltamethrin) and Bifen Insecticide/Termiticide (bifenthrin) for controlling mosquitoes
- 2) Assess the extent to which suppression of mosquito abundance differs between study sites and mosquito species over time



CDC CO₂-baited trap

Materials and Methods

- Lots treated in Magnolia Ridge and Cedar Ridge every 21 days with bifenthrin or deltamethrin using backpack mist blowers
- Adults traps set one night/week from May 18 – Oct 19 (23 weeks, 377 trap nights) at 13 treatment (6 bifenthrin, 7 deltamethrin) and 4 control locations (17 total traps)
- Traps were baited with dry ice and set between 4:00 – 6:00pm and retrieved the following morning between 8:00 – 9:00am
- Ovitrap were set at the same 17 fixed sampling locations. Ovistrips were retrieved/replaced once/week
- Adult mosquitoes transported on ice and ovistrips transported in ziploc bags to the lab where they were tabulated by species, treatment, location, and week

Results

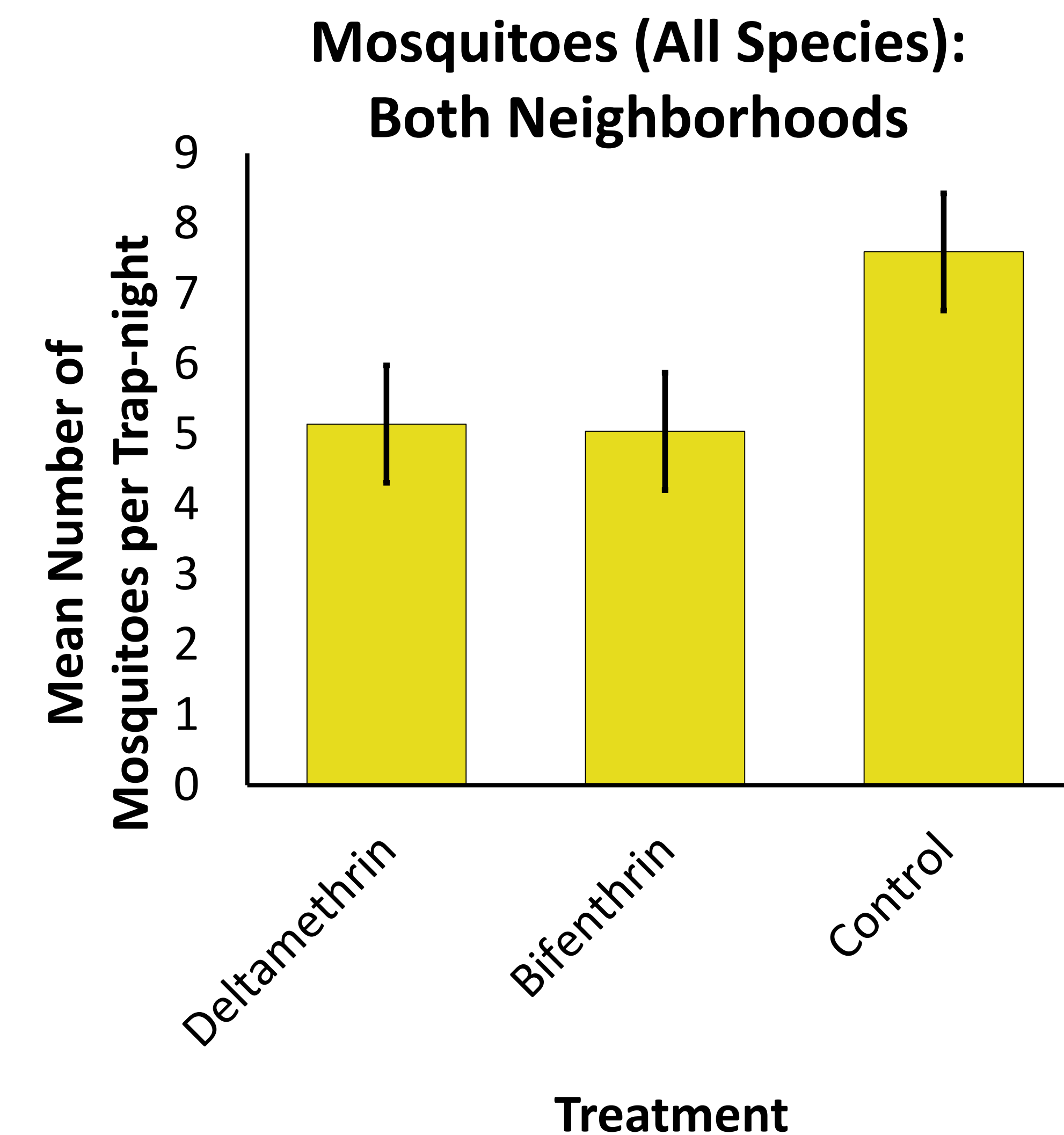


Figure 1. Total adult mosquito counts were suppressed by both insecticides, however no significant difference was determined

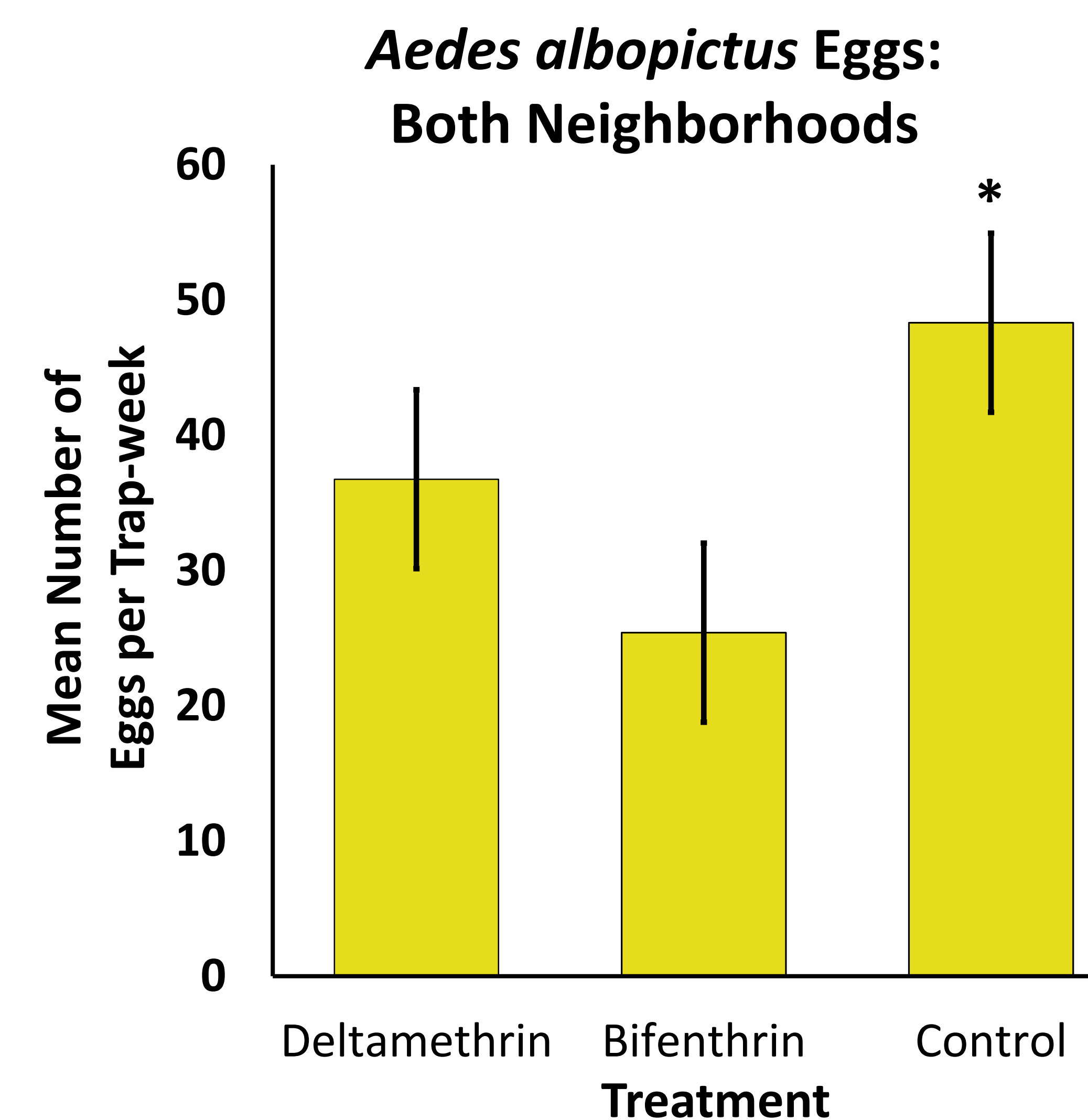


Figure 2. *Aedes albopictus* egg counts were significantly higher in control traps compared to treatment traps

Observations

- 2,070 adult mosquitoes collected; 12,912 *Ae. albopictus* eggs collected
- The total number of adult mosquitoes collected was significantly highest on June 15, 2015
- Deltamethrin and bifenthrin reduced total adult populations, *Ps. columbiae* adults, and *Ae. albopictus* eggs, compared to control. However, these effects varied between neighborhoods and weeks
- Deltamethrin and bifenthrin showed differences in efficacy, depending on mosquito species and neighborhood

Conclusions

- These insecticides suppressed mosquito populations; however these trends were not significant
- Weather trends (precipitation and temperature) may have an adverse affect on insecticide efficacy. Possibly washing the insecticides away and creating more areas for oviposition, i.e. puddled water
- Further studies are needed to test the efficacy of Suspend® Polyzone® and Bifen Insecticide/Termiticide at an application frequency greater than 21 days

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