The Zumba™ Mosquito Trap: A Novel Surveillance Tool for Host-Seeking Mosquitoes

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INTRODUCTION

Since the detection of West Nile virus (WNV) in Fairfax County in 2000, an intensive mosquito surveillance program has been established. With a variety of WNV vector species in the area, it is essential to utilize a more efficient trap to collect the maximum number and variety of mosquitoes.1,2

In the past four years, Fairfax County has detected WNV in several mosquito species, namely Cx. pipiens, Cx. restuans, Cx. erraticus, Aedes albopictus and Aedes vexans. Our current routine surveillance system consists of a Reiter gravid trap paired with a CDC Miniature Light trap at 70 trap sites located around Fairfax County.

WNV-infected Cx. pipiens and Cx. restuans are predominantly collected in the Gravid traps. This trap attracts oviposition-site-seeking mosquitoes, and have a high WNV infection rate in our area. On the other hand, the CDC trap collects host-seeking mosquitoes; however, the WNV infection rate is low.

Our study evaluated a novel mosquito trap, the Zumba Mosquito Trap [ISCA Technologies, Riverside, CA], against three existing mosquito traps (BG-Sentinel, CDC Miniature Light, CDC Fay-Prince).1,3 Based on the findings of a previous study, all four trap types were baited with the BG-Lure and CO2.1

The research question for our study was as follows:

Which trap is most efficient in collecting host-seeking WNV vector species, Cx. pipiens, Cx. restuans and Ae. albopictus in Fairfax County?

METHODS

Traps were set out in a 4x4 Latin square configuration. All traps were baited with the BG-Lure and CO2 (dry ice in a cooler).

• Trapping began on July 24, 2007 (EPI week 30), and continued for 13 weeks.

• Traps were set every Monday and rotated every 24 hours. Traps were picked up on Friday mornings after they had passed through all four sites in the Latin square.

• Traps were set in a peri-urban habitat located in Fairfax County, VA.

Zumba™ Mosquito Trap: Uses visual and chemical stimuli including color, human-like size and shape as well as odor plume dissemination and direction. Lure placed inside trap. CO2 disseminated directly into the catch area via rubber tubing.

BG-Sentinel™ Mosquito Trap: Uses attraction currents, visual cues and releases attractants through a large surface area. Lure placed inside trap. CO2 hung beside the trap.

CDC Miniature Light Trap: Uses a small light bulb. Lure and CO2 hung beside the trap.

CDC Fay-Prince Trap: Uses contrasting black and white panels in addition to a wind orienting cover. Lure and CO2 hung beside the trap.

The mean number of female Cx. pipiens and Cx. restuans mosquitoes collected in the Zumba trap was comparable to the collection of oviposition-site-seeking Cx. pipiens and Cx. restuans mosquitoes in the routine CDC traps. Both of these trap types collected significantly more (p < 0.01) Cx. pipiens mosquitoes than the routine CDC trap.

The Zumba trap was the most productive and diverse trap—averaging 35.51 mosquitoes per trap period; however, the Zumba trap still collected significantly more (p < 0.01) Ae. albopictus mosquitoes than the CDC and Fay-Prince traps.

CONCLUSIONS

• The Zumba trap was the most productive and diverse trap—averaging 35.51 mosquitoes and 4.6 species per trap period.

• The Zumba trap collected significantly more Cx. pipiens mosquitoes than the other trap types in the study area.

• The Zumba trap was the only trap type to collect WNV-positive host-seeking Cx. pipiens mosquitoes in the study area.

• Both the Zumba and BG-Sentinel traps collected significantly more Ae. albopictus mosquitoes than CDC and Fay-Prince traps.

• The WNV infection rate in the Cx. pipiens and Ae. albopictus mosquitoes collected in the Zumba trap was consistently greater than the infection rates for these species collected in the routine CDC traps.

REFERENCES


SUMMARY OF RESULTS

• The Zumba trap was the most productive and diverse trap—averaging 35.51 mosquitoes and 4.6 species per trap period.

• The Zumba trap collected significantly more Cx. pipiens mosquitoes than the other trap types in the study area.

• The Zumba trap was the only trap type to collect WNV-positive host-seeking Cx. pipiens mosquitoes in the study area.

• Both the Zumba and BG-Sentinel traps collected significantly more Ae. albopictus mosquitoes than CDC and Fay-Prince traps.

• The WNV infection rate in the Cx. pipiens and Ae. albopictus mosquitoes collected in the Zumba trap was consistently greater than the infection rates for these species collected in the routine CDC traps.

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