



Field Comparison of Novel and Industry Standard Traps for Collecting *Aedes albopictus* in Northern Virginia

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Introduction:

Aedes albopictus is a potential West Nile virus (WNV) bridge vector in Fairfax County, Virginia and has established itself as the primary nuisance mosquito in the area. Unfortunately, information regarding the abundance of this species, as well as the extent of its involvement in WNV transmission cycles in this area is limited, as this species is not readily collected by existing traps.

In August and September of 2006, two novel mosquito traps (the BG Sentinel and the CMT-20 - also known as the Zumba) were evaluated against the industry standard, CO₂ baited, CDC light trap in order to answer the following questions:

1. Which trap collects the greatest proportion of *Ae. albopictus*?
2. Which trap is most efficient in collecting *Ae. albopictus*?

Methods:

Five replicates of a 5x5 Latin square design were used to evaluate the efficacy of the two novel mosquito traps relative to the CDC light trap. The novel traps were always used with their respective lures and were sometimes used with a source of CO₂. All traps were run for 24 hour periods. The following five trap configurations were compared:

1. BG Sentinel + Lure + CO₂
2. BG Sentinel + Lure
3. CMT-20 + Lure + CO₂
4. CMT-20 + Lure
5. CDC + CO₂

Statistical analysis (using SPSS) of the trapping data was performed to answer the two research questions. Data was normalized (using a log(x+1) transformation) prior to statistical analysis. ANOVA (followed by Tukey's post hoc test) and Chi square (with Bonferroni correction for post hoc tests) methods were used.

Traps:

CMT-20 (Zumba): The trap combines a wide variety of visual and chemical cues that are used by host-seeking mosquitoes. The trap is sold with a mosquito lure (SkinLure) which mimics the odor profile of human skin.

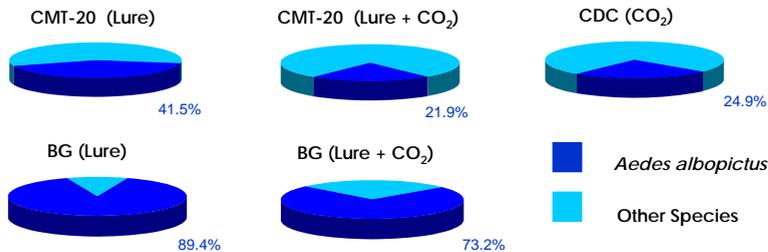
BG Sentinel: Mimics human convection currents, employs attractive visual cues, and releases attractants through a large surface area. Trap performance is enhanced with the novel BG Lure which contains ammonia, lactic acid and fatty acids.

CDC Light Trap: The industry standard mosquito trap for host-seeking mosquitoes. Mosquitoes are attracted with CO₂ and a light bulb.



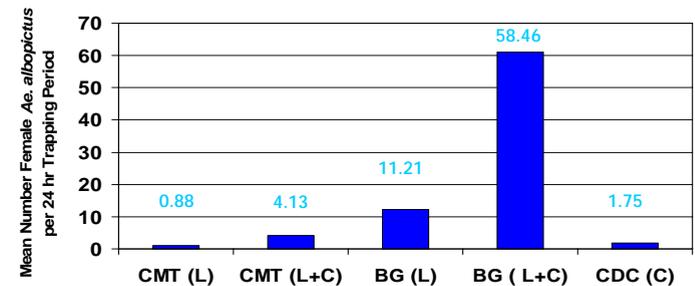
From left to right: the CMT-20 (Zumba), the BG Sentinel, and the CDC Light Trap.

Results:



LEFT: Proportion of *Ae. albopictus* and other species collected using the 5 trap configurations. The proportions of *Ae. albopictus* collected with the BG (Lure) and BG (Lure + CO₂) were significantly different from all other traps. No significant difference between the CMT-20 (Lure), CMT-20 (Lure + CO₂), and the CDC (CO₂).

RIGHT: Mean number of female *Ae. albopictus* collected per 24 hour trapping period. BG (Lure) and BG (Lure + CO₂) were significantly better than the CDC (CO₂), CMT-20 (Lure), and CMT-20 (Lure + CO₂). No significant difference between CDC and the CMT-20 (Lure) and the CMT-20 (Lure + CO₂).



Conclusions:

- The BG Sentinel (with BG Lure and without CO₂) collected on average, over 6 times the number of female *Ae. albopictus* than the CO₂ baited CDC light trap in a 24 hour trapping period. With the addition of CO₂, the BG Sentinel trap (with BG Lure) collected an average of 33 times more female *Ae. albopictus* per 24 hour trapping period than the CDC light trap – an increase in trapping efficiency of over 400%. With or without the lure, the BG Sentinel was significantly more efficient than the other traps. Although the CMT-20 (Zumba) trap collected significantly more *Ae. albopictus* when used with the SkinLure and a source of CO₂ than the CMT-20 (Zumba) when used with the SkinLure alone, the CMT-20 (with or without CO₂) was not significantly better at collecting *Ae. albopictus* than the CDC trap.
- The CMT-20 (Zumba) trap did not collect a significantly different proportion of *Ae. albopictus* than the CDC trap (whether or not it was used with a source of CO₂). The BG Sentinel trap collected significantly higher proportions of *Ae. albopictus* than the other traps. When used without CO₂, 89.4% of the mosquitoes collected with the BG Sentinel (plus BG Lure) were *Ae. albopictus*. Adding a source of CO₂ decreased the proportion of *Ae. albopictus* to 73.2%.
- Based on the results of this study, the BG Sentinel trap would be an invaluable addition to WNV surveillance and control programs which aim to further their understanding of the WNV transmission dynamics of *Ae. albopictus*.

