

FINAL REPORT

2002 ABC TRAP EVALUATION PROJECT

Sponsored by:

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Prepared by:

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Purpose

The aim of this study was to compare the mosquito-trapping prowess of the BioSensory DragonFly, EnviroSafe Technologies Mosquito MegaCatch, Coleman Mosquito Deleto, Coleman Mosquito Deleto Prototype, American Biophysics Corporation Mosquito Magnet Liberty, Lentek Mosquito Trap, Flowtron PowerTrap and Applica SonicWeb. This study was designed to compare the numbers and species caught and to not assess effectiveness. The issue of whether or not traps can be used to effectively suppress mosquitoes and other biting flies needs to be substantiated with additional studies.

Materials and Methods

Trap Configurations:

The Mosquito Magnet Liberty, Lentek Mosquito Trap, Deleto (both traps), Flowtron PowerTrap, BioSensory Dragonfly and MegaCatch traps all employ CO₂ and octenol as attractants. The first four convert propane into CO₂, heat & moisture, while the remaining traps emit CO₂ directly from a gas cylinder. The SonicWeb trap releases a low frequency sonic “heartbeat”, octenol, heat and an ultraviolet reflection as well as other visual cues to attract mosquitoes. All traps were operated at the highest attractant setting per the manufacturer’s directions.

Study Site:

The project was performed on a 10-acre peninsula surrounded by salt marsh on the campus of the Public Health Entomology Research & Education Center (PHEREC) of Florida A&M University located on the St. Andrews Bay in Panama City, Florida.

Study Design:

The eight traps identified above were randomly assigned one trap/location to eight locations separated by a distance of over 300 ft. Traps were operated simultaneously from 3:30 p.m. until about 7 a.m. CT from August 6 through October 24, 2002 on evenings when weather conditions were suitable for mosquito activity. After operation, trap contents were collected, sorted, identified to species and counted. Mosquitoes and biting midges were collected; however, biting midge numbers were estimated when counts exceeded several hundred. Biting midge species identification was accomplished through regular examination of samples taken throughout the season. Traps were rotated clockwise to the nearest adjacent location after each trapping night. This sequence continued until each trap had operated at all eight locations. A complete rotation through all eight locations was considered a replication. Three “good” replications were performed. Data from nights when mechanical failure or adverse weather occurred were excluded from the database. Traps were left at the same location and rerun during such occasions. Thus, total trap counts were based on three collections/location/trap (i.e., 24 runs/trap). Weather data was recorded during the study from the Panama City International Airport located within half a mile from the study site.

Data Analysis:

Total mosquitoes and biting midges collected by trap and species abundance by trap were charted using Microsoft Excel 2000 pivot tables and charting functions.

Analysis of variance and mean separation tests were conducted on log-transformed data and tested for statistical differences among traps using SAS PC.

Results and Discussion

Environmental Data:

Conditions during the study are presented in Table 1. Temperatures were very consistent with averages ranging from upper 70's to mid 80's except on two occasions near the end of the study in October when the temperature averaged in the mid to upper 60's. Rainfall was zero or trace for all days except Aug 22 (~.5 inches), Sept. 24 (~.5 inches) and Oct. 23 (~1 inch). The rain during these days did not appear to affect trap catch because much of it fell outside of the times when the traps were operating.

Table 1. Climatology during 2002 mosquito trapping study.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

STATION: PANAMA CITY
 MONTH: AUGUST-OCTOBER
 YEAR: 2002
 LATITUDE: 30 12 N
 LONGITUDE: 85 41 W

| | | TEMPERATURE IN F: | | | | | :PCPN: | | | SNOW: | WIND | | :SUNSHINE: | | | SKY | :PK WND | | |
|-------|----|-------------------|-----|-----|-----|-----|--------|------|-----|-------|------|-----|------------|-----|------|-----|---------|-----|-----|
| MO | DY | MAX | MIN | AVG | DEP | HDD | CDD | WTR | SNW | DPTH | SPD | SPD | DIR | MIN | PSBL | S-S | WX | SPD | DR |
| Aug. | 6 | 90 | 75 | 83 | 3 | 0 | 18 | 0.00 | 0.0 | 0 | 5.5 | 12 | 250 | M | M | 1 | 1 | M | M |
| | 8 | 90 | 72 | 81 | 1 | 0 | 16 | 0.00 | 0.0 | 0 | 8.0 | 16 | 90 | M | M | 2 | | 23 | 90 |
| | 14 | 88 | 76 | 82 | 2 | 0 | 17 | 0.09 | 0.0 | 0 | 4.2 | 10 | 190 | M | M | 3 | 1 | M | M |
| | 15 | 91 | 76 | 84 | 4 | 0 | 19 | 0.00 | 0.0 | 0 | 6.6 | 12 | 220 | M | M | 2 | | 18 | 220 |
| | 22 | 91 | 74 | 83 | 3 | 0 | 18 | 0.43 | 0.0 | 0 | 3.8 | 29 | 170 | M | M | 2 | 8 | 39 | 160 |
| | 26 | 86 | 73 | 80 | 1 | 0 | 15 | 0.00 | 0.0 | 0 | 5.6 | 13 | 240 | M | M | 3 | | 18 | 230 |
| Sept. | 9 | 93 | 74 | 84 | 5 | 0 | 19 | 0.00 | 0.0 | 0 | 6.8 | 12 | 100 | M | M | 2 | | 18 | 90 |
| | 10 | 89 | 75 | 82 | 4 | 0 | 17 | 0.00 | 0.0 | 0 | 2.9 | 8 | 250 | M | M | 1 | 8 | M | M |
| | 11 | 92 | 73 | 83 | 5 | 0 | 18 | 0.00 | 0.0 | 0 | 4.5 | 14 | 190 | M | M | 1 | | 23 | 190 |
| | 12 | 93 | 72 | 83 | 5 | 0 | 18 | 0.02 | 0.0 | 0 | 7.5 | 15 | 120 | M | M | 4 | | 16 | 70 |
| | 16 | 90 | 74 | 82 | 5 | 0 | 17 | T | 0.0 | 0 | 2.9 | 9 | 280 | M | M | 2 | 18 | M | M |
| | 17 | 90 | 75 | 83 | 6 | 0 | 18 | 0.00 | 0.0 | 0 | 4.4 | 10 | 250 | M | M | 1 | 18 | M | M |
| | 18 | 89 | 76 | 83 | 6 | 0 | 18 | 0.00 | 0.0 | 0 | 2.9 | 9 | 220 | M | M | 0 | 18 | M | M |
| | 23 | 91 | 72 | 82 | 7 | 0 | 17 | 0.00 | 0.0 | 0 | 10.0 | 15 | 100 | M | M | 1 | | 20 | 100 |
| | 24 | 78 | 73 | 76 | 1 | 0 | 11 | 0.47 | 0.0 | 0 | 11.0 | 18 | 80 | M | M | 8 | 1 | 23 | 80 |
| | 30 | 89 | 74 | 82 | 9 | 0 | 17 | T | 0.0 | 0 | 7.6 | 12 | 90 | M | M | 2 | 18 | M | M |
| Oct. | 1 | 90 | 74 | 82 | 9 | 0 | 17 | 0.05 | 0.0 | 0 | 9.1 | 23 | 100 | M | M | 4 | 18 | 29 | 100 |
| | 3 | 87 | 73 | 80 | 8 | 0 | 15 | T | 0.0 | 0 | 9.7 | 16 | 140 | M | M | 3 | 18 | 22 | 140 |
| | 7 | 89 | 72 | 81 | 11 | 0 | 16 | 0.06 | 0.0 | 0 | 4.9 | 15 | 330 | M | M | 3 | 138 | 24 | 330 |
| | 8 | 87 | 71 | 79 | 9 | 0 | 14 | 0.00 | 0.0 | 0 | 3.6 | 8 | 310 | M | M | 2 | | M | M |
| | 9 | 85 | 71 | 78 | 8 | 0 | 13 | 0.00 | 0.0 | 0 | 8.5 | 12 | 70 | M | M | 4 | 18 | M | M |
| | 17 | 74 | 53 | 64 | -3 | 1 | 0 | 0.00 | 0.0 | 0 | 5.7 | 10 | 360 | M | M | 1 | 8 | M | M |
| | 23 | 84 | 67 | 76 | 11 | 0 | 11 | 1.17 | 0.0 | 0 | 9.6 | 14 | 100 | M | M | 7 | 18 | M | M |
| | 24 | 72 | 66 | 69 | 4 | 0 | 4 | 0.04 | 0.0 | 0 | 8.4 | 10 | 80 | M | M | 10 | 18 | M | M |

Trap Catch Comparison:

The number of mosquitoes caught during this study was relative low because it was an extremely dry year. Figure 1 presents the total catch by trap for the entire test period based on 24 runs of each trap. The MegaCatch and Mosquito Magnet collected 2.5 to 3X more mosquitoes than the next nearest trap, the Lentek Mosquito Trap, and at least 5X-6X more mosquitoes than all of the other traps. The SonicWeb caught the fewest mosquitoes, well below all of the other traps. The number of biting midges caught by trap is presented in Figure 2. The Mosquito Deleto traps (Deleto & Prototype) collected the greatest number followed closely by the Mosquito Magnet. The other traps collected as much as 10X fewer. The Sonic Web performed better with biting midges than it did with mosquitoes, but still collected about 4X fewer than the Deleto and Magnet traps. The MegaCatch trap was supplemented with a mesh bag to facilitate biting midge collection, however, a considerable number of the midges still escaped. It would have likely performed better with a better midge trapping system.

The mosquito species compositions for the various traps are presented in Figures 3-10. Generally with exception of the Flowtron Powertrap, the greatest species diversity was found in the traps that collected the most mosquitoes. The Mosquito Magnet Liberty led other traps with sixteen species, while the Mosquito MegaCatch and Flowtron Powertrap collected twelve. *Aedes taeniorhynchus* and *Anopheles crucians* were the predominant species; however, vector species such as *Culex salinarius* and *Aedes albopictus* were collected as well. Biting midge species composition by trap was not tabulated. The most prevalent species were *Culicoides furens* and *Culicoides melleus*. *Culicoides stellifer*, *Culicoides mississippiensis*, *Culicoides haemotopotus*, *Culicoides crepuscularis* and *Culicoides mulrennani* were also collected.

Fig. 1. Total mosquito catch and variance by trap.

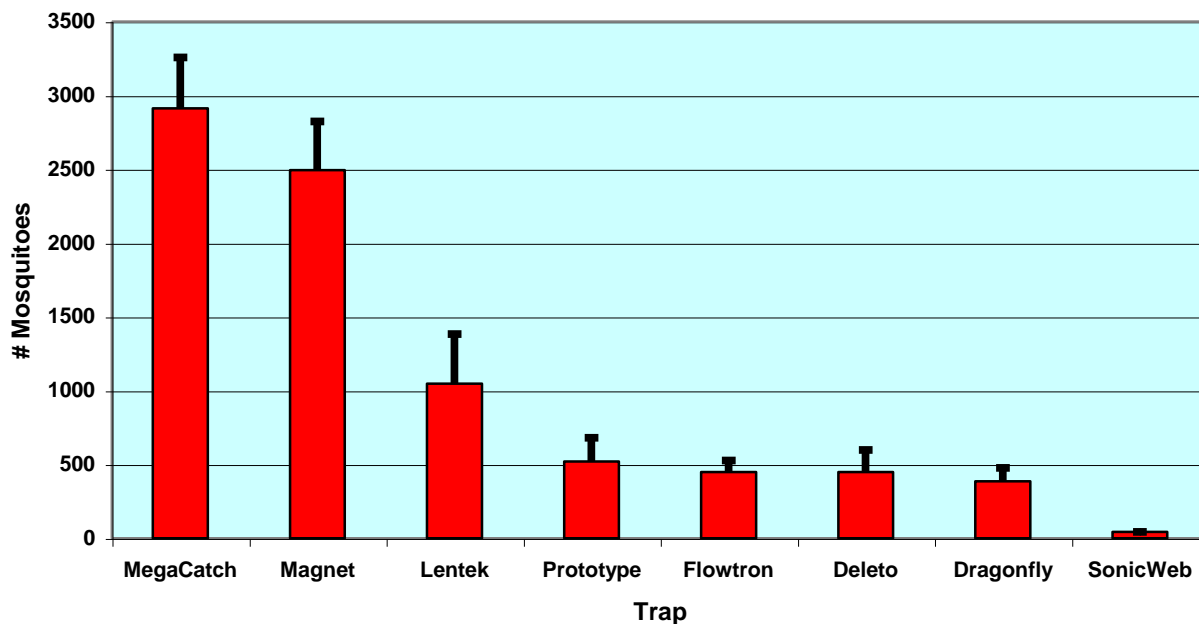


Fig. 2. Total biting midge catch by trap.

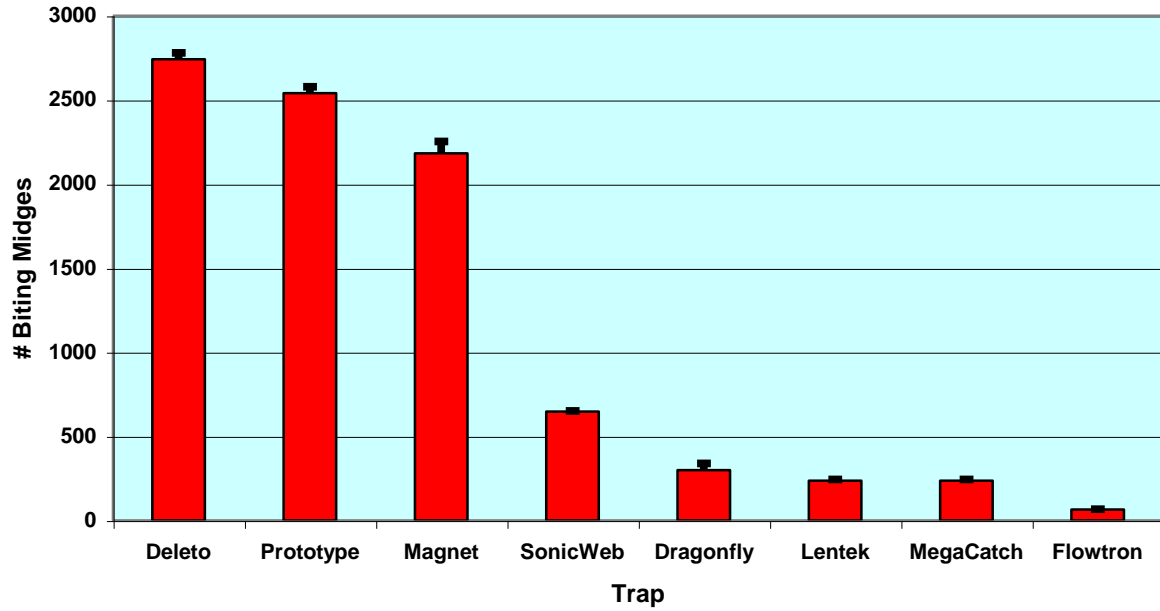


Fig. 3. Species composition for Mosquito MegaCatch trap.

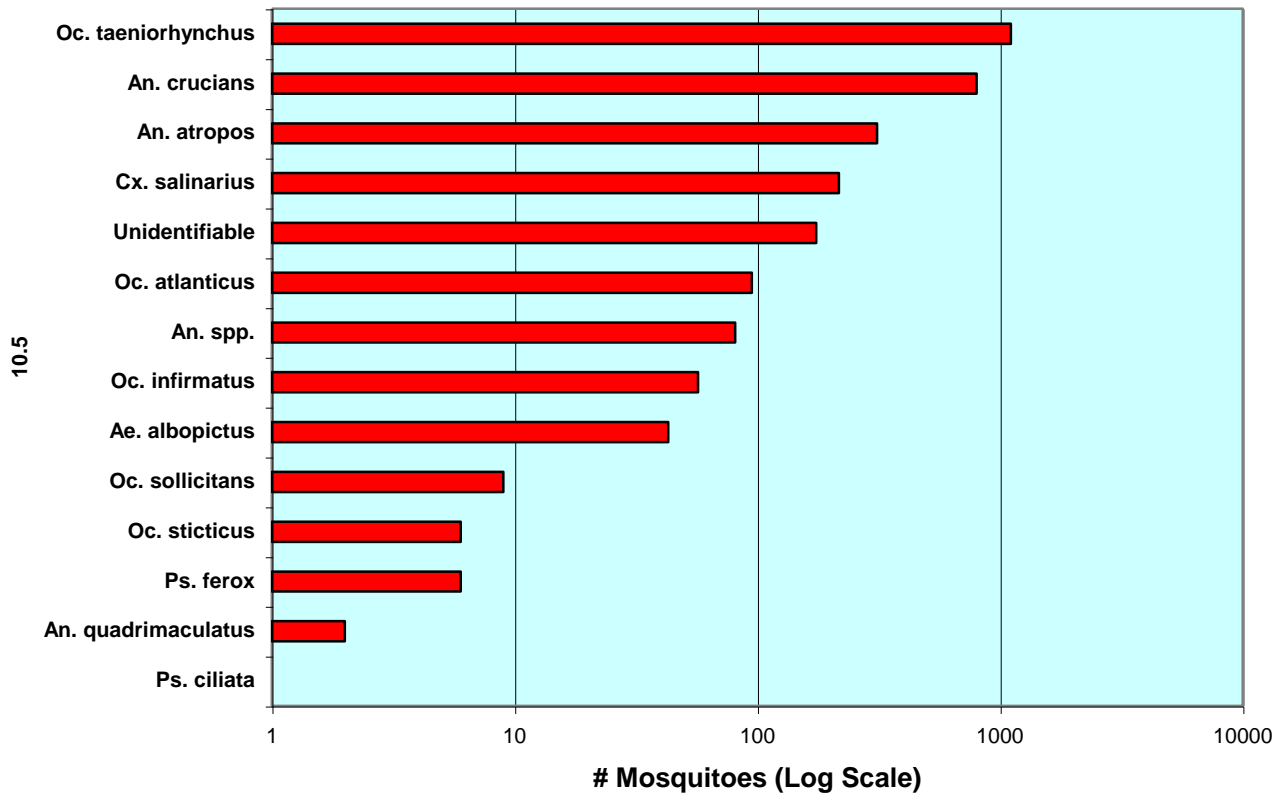


Fig. 4. Species composition for Mosquito Magnet Liberty trap.

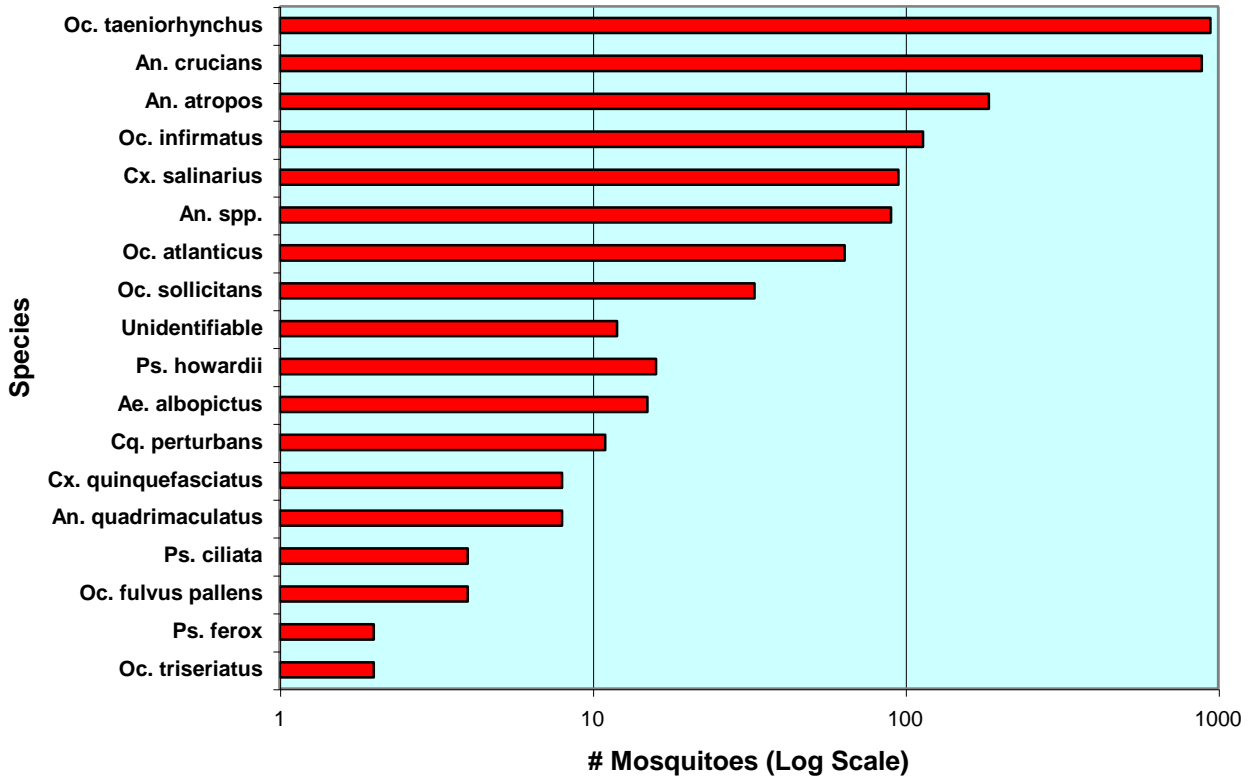


Fig. 5. Species composition for Lentek Mosquito trap.

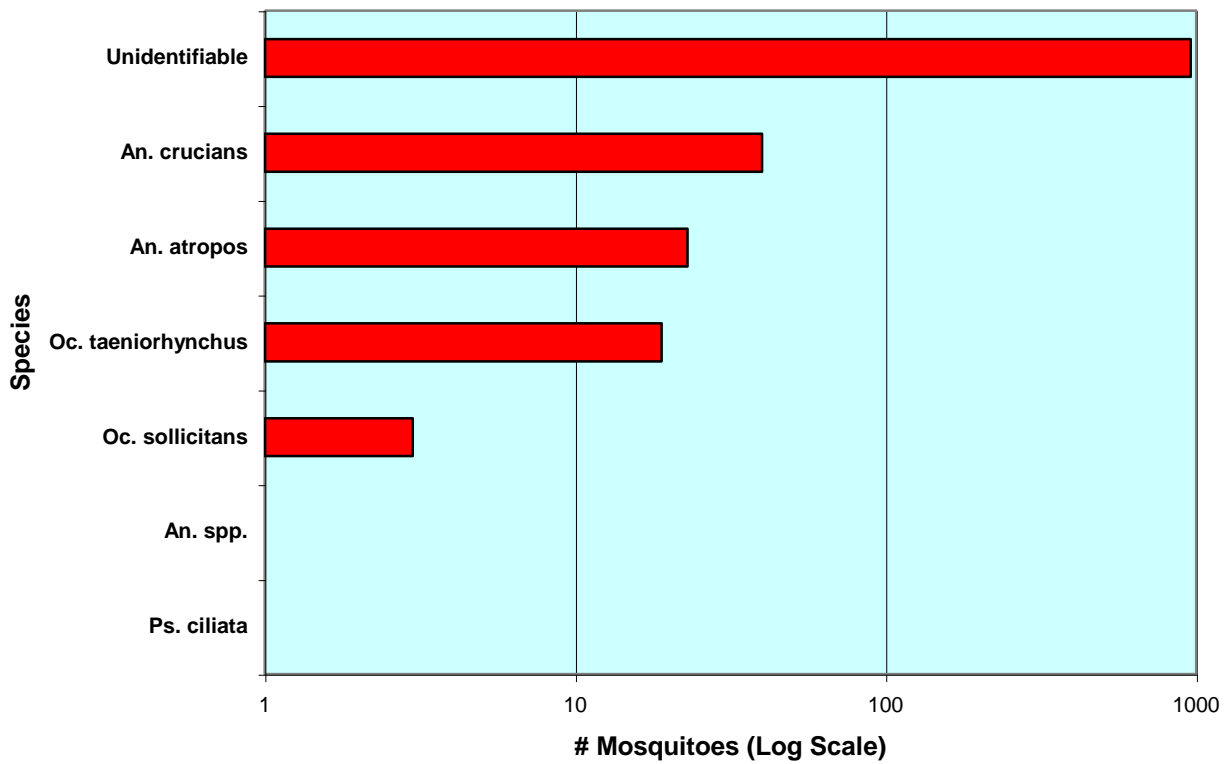


Fig. 6. Species composition for Mosquito Deleto Prototype trap.

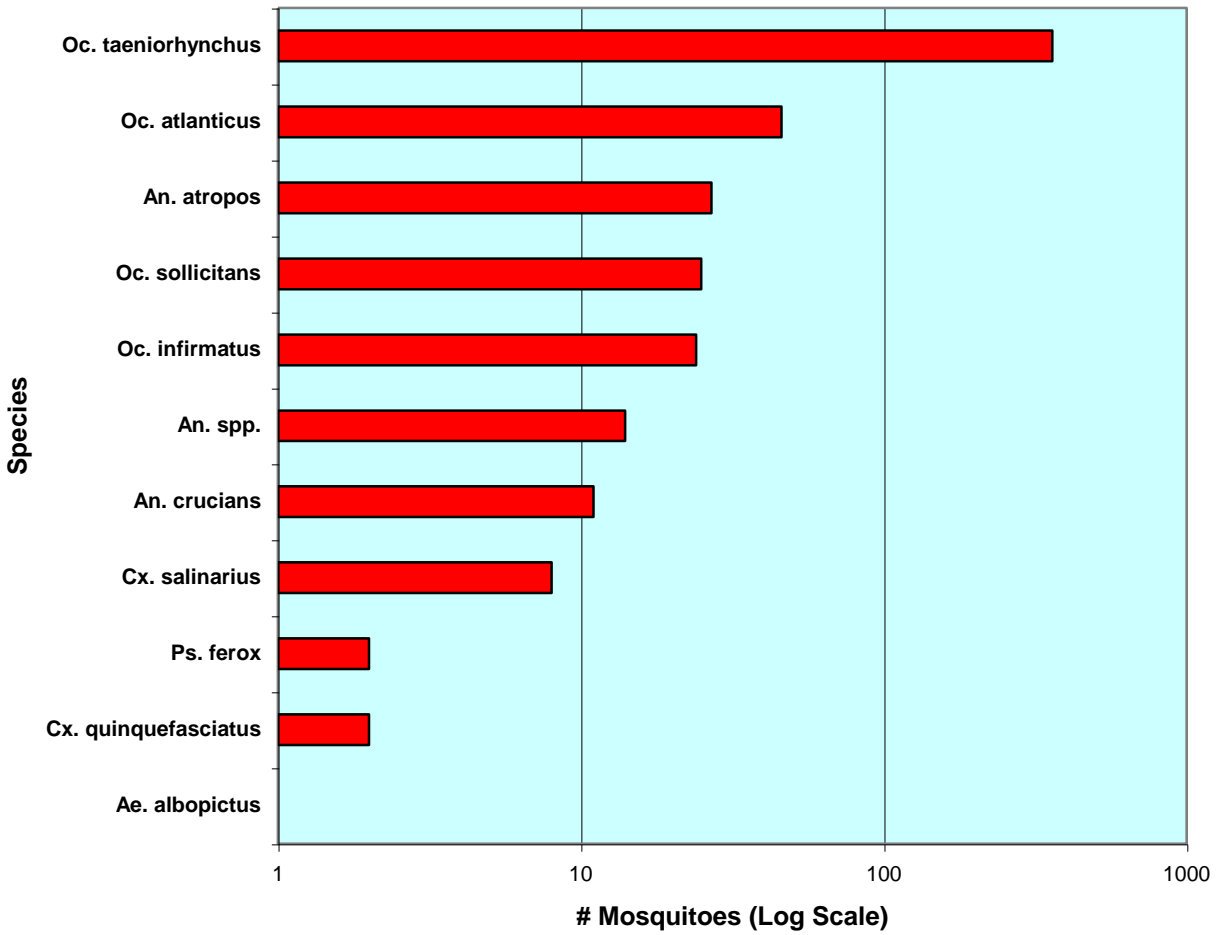


Fig. 7. Species composition for Mosquito Deleto trap.

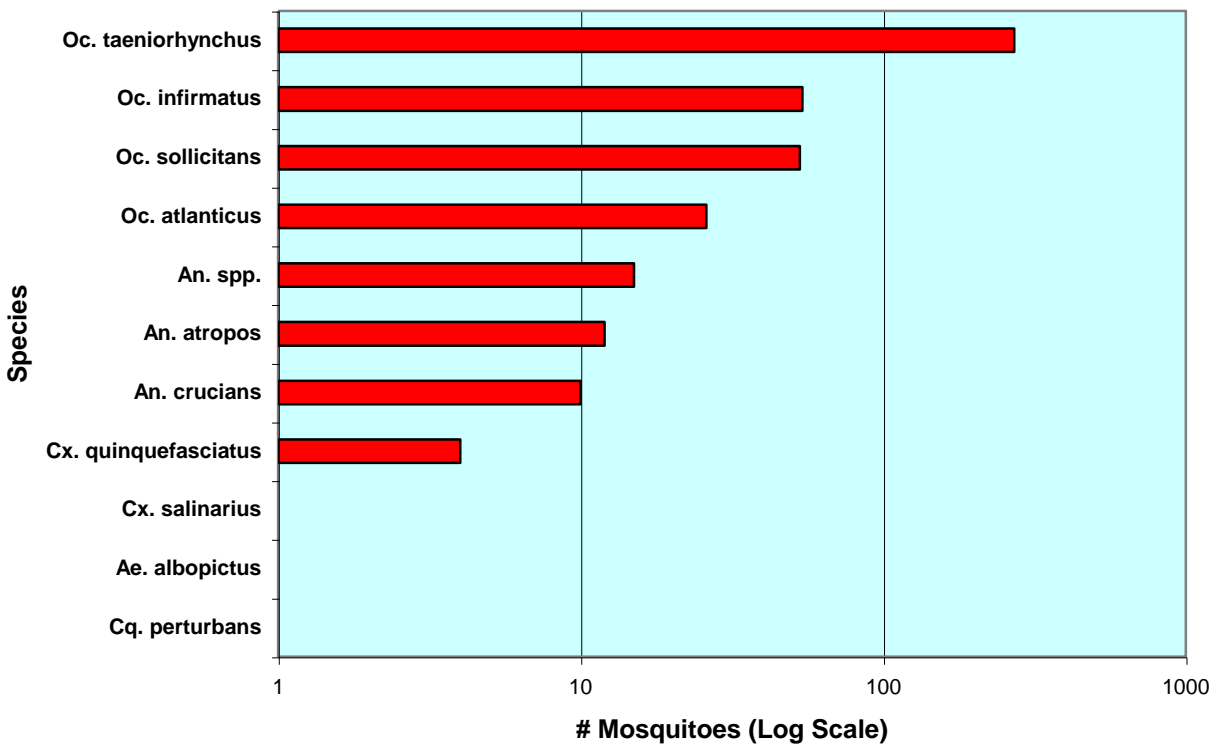


Fig. 8. Species composition for Flowtron PowerTrap.

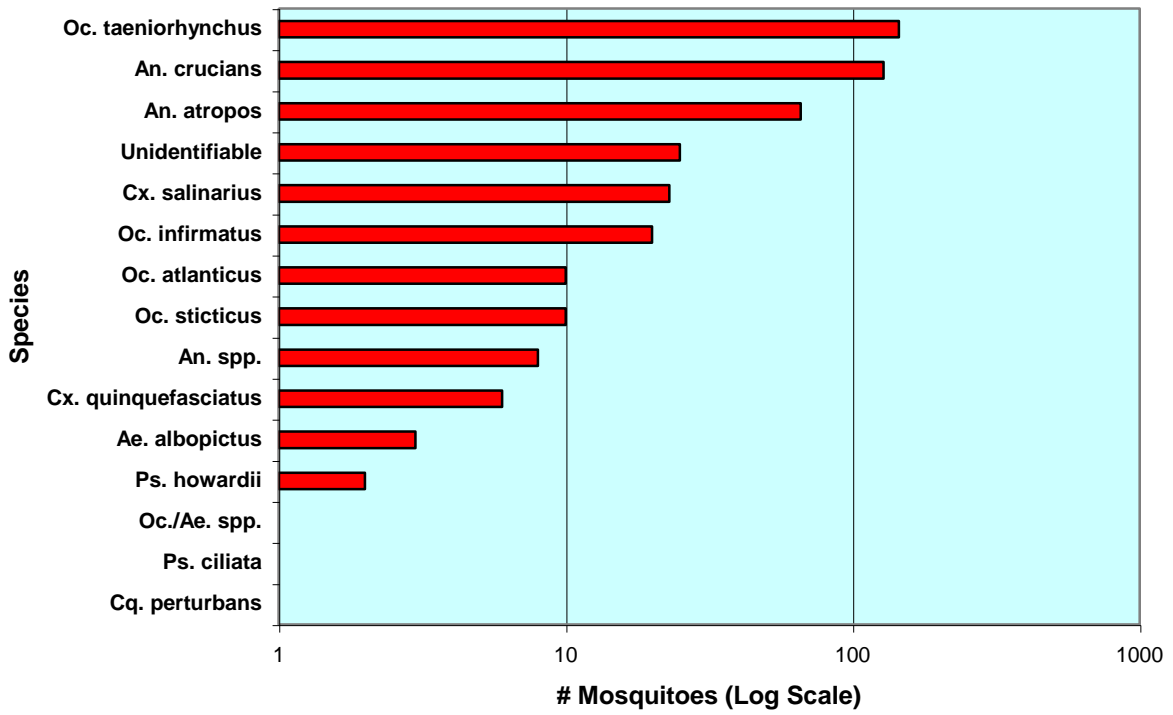


Fig. 9. Species composition for BioSensory DragonFly trap.

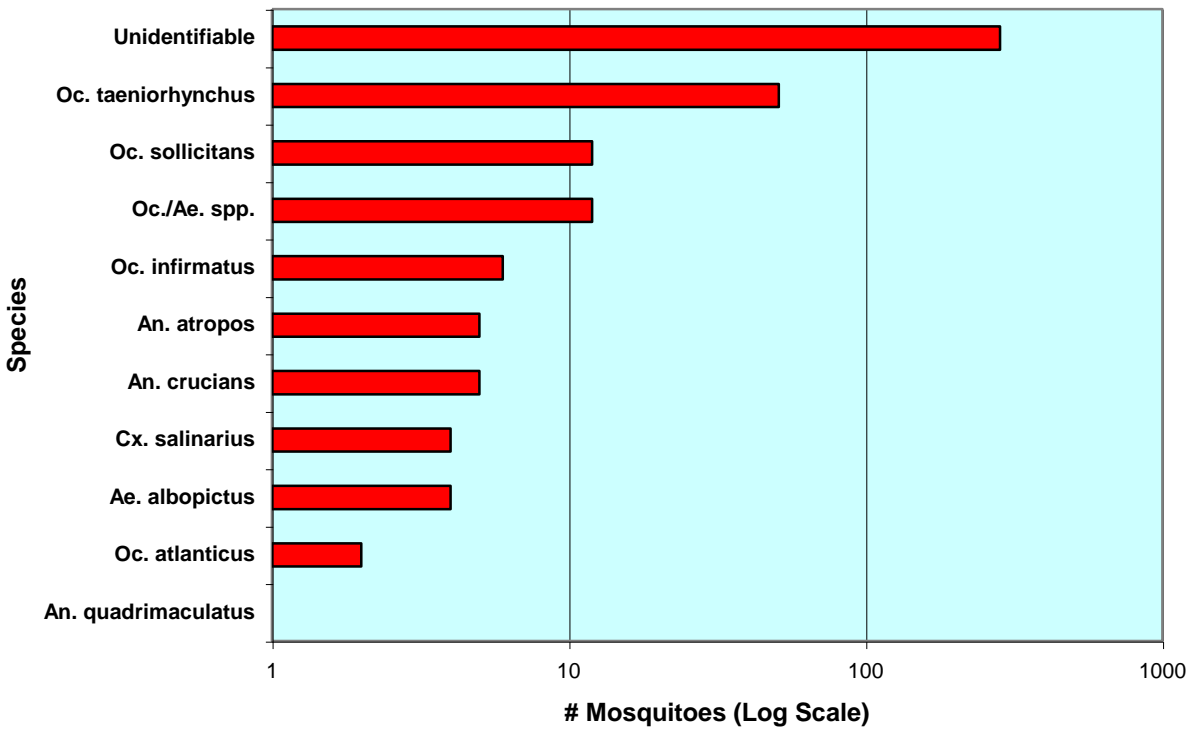
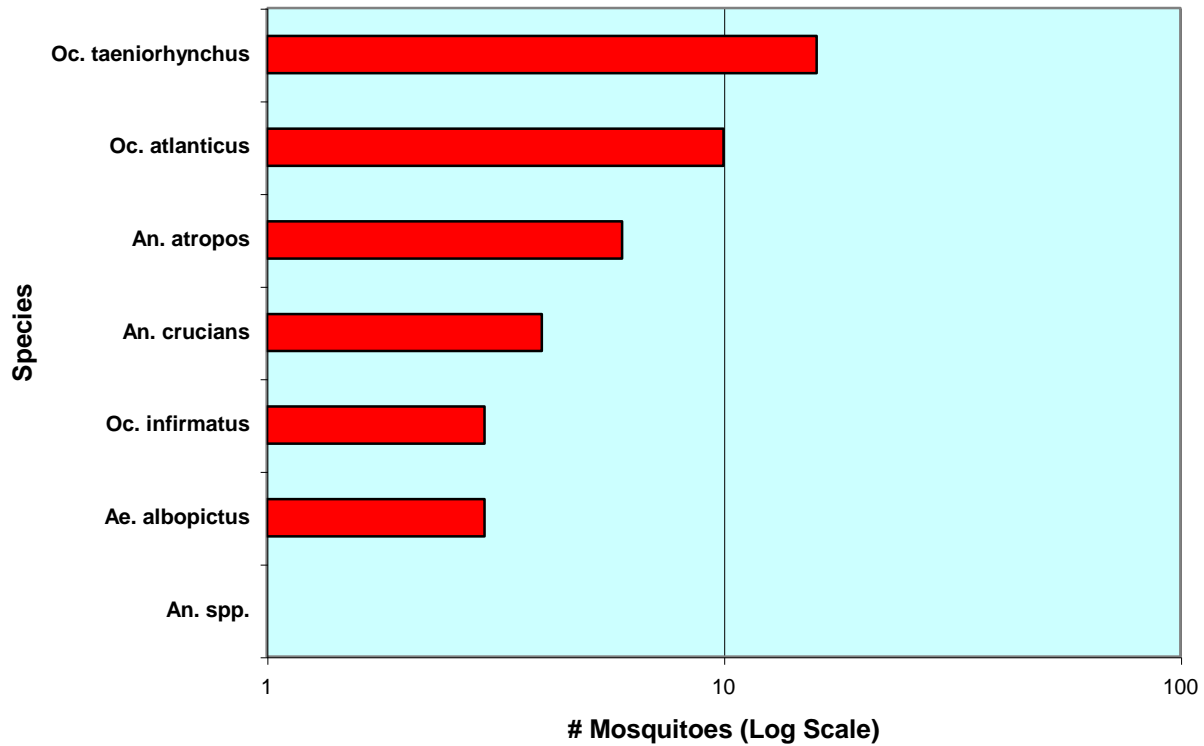


Fig. 10. Species composition for Applica SonicWeb trap.



Operational Notes:

The pilot lights on the Flowtron Powertrap and Coleman Deleto would regularly extinguish under windy conditions. The Coleman Deleto Prototype trap was often difficult to start. The Mosquito Magnet Liberty would occasionally shut off under high humidity conditions. The Lentek Mosquito Trap and BioSensory Dragonfly ran with very few problems. We never had any problems with Mosquito MegaCatch.