

FINAL REPORT

2003 ABC TRAP EVALUATION PROJECT

Sponsored by:

American Biophysics Corporation

Prepared by:

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Purpose

The aim of this study was to compare the mosquito-trapping prowess of the American Biophysics Corporation Mosquito Magnet Liberty, Mosquito Magnet Defender, Blue Rino Skeeter-Vac, Lentek Mosquito Trap, Lentek EcoTrap, Coleman Mosquito Deleto 2200 System and Applica SonicWeb. This study was designed to compare the numbers and species caught and to not assess mosquito control efficacy.

Materials and Methods

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 seven traps identified above were randomly assigned one trap/location to seven sites separated by a distance of over 300 ft. according to a Latin-square design. Traps were operated continuously 24/7 except for a brief period of about one hour when rotating positions as described below. Trap contents were collected each morning between 7 and 8 a.m., sorted, identified to species and counted. Fresh sticky panels and collection bags were replaced each morning. Mosquitoes and biting midges were collected; however, biting midge numbers were estimated when counts exceeded several hundred. Biting midge species identification was accomplished by examining random samples taken throughout the season. Traps were rotated clockwise to the nearest adjacent location after each trapping day. This sequence continued until each trap operated at all seven locations. A complete rotation through all seven 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. Trap contents collected during weekends were discarded so that trap collections were based on 24-hr collection periods. Thus, total trap counts were based on three collections/location (i.e., 21 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 (for mosquitoes only) 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 mostly in the 80's (range from 74 to 85°F). Rainfall ranged from 0 to over 3 inches. Most of the rain fell during the afternoon hours when mosquito flight activity was low.

Table 1. Climatological data for each day when traps were operated during 2003 mosquito trapping study.

LOCAL CLIMATOLOGICAL DATA FROM PANAMA CITY AIRPORT (SOURCE: NOAA)
 STATION: PANAMA CITY
 MONTH: MAY - AUG
 YEAR: 2003
 LATITUDE: 30 12 N
 LONGITUDE: 85 41 W

MO	TEMPERATURE IN F:					:PCPN:			SNOW:			WIND			:SUNSHINE:			SKY		:PK WND	
	1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18		
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR			
May	27	86	70	78	4	0	13	0.00	0.0	0	7.5	13	10	M	M	2	1	M	M		
	28	84	64	74	-1	0	9	0.00	0.0	0	9.0	14	280	M	M	0		M	M		
June	2	87	75	81	5	0	16	T	0.0	0	6.3	13	260	M	M	3	8	17	270		
	9	88	75	82	5	0	17	0.00	0.0	0	6.0	13	260	M	M	2	18	M	M		
	10	88	76	82	5	0	17	0.00	0.0	0	5.2	10	260	M	M	2	1	M	M		
July	23	88	74	81	2	0	16	0.14	0.0	0	4.5	10	140	M	M	2	1	M	M		
	25	89	71	80	1	0	15	0.00	0.0	0	4.1	9	180	M	M	1	1	M	M		
	2	82	74	78	-2	0	13	0.65	0.0	0	6.5	14	210	M	M	6	13	20	240		
	7	91	74	83	3	0	18	1.02	0.0	0	5.4	10	230	M	M	3	18	M	M		
	8	92	76	84	4	0	19	0.00	0.0	0	4.8	8	230	M	M	1		M	M		
	9	91	78	85	5	0	20	0.00	0.0	0	3.5	10	230	M	M	2		M	M		
	14	86	77	82	2	0	17	T	0.0	0	4.6	7	110	M	M	2		M	M		
	15	89	75	82	2	0	17	0.29	0.0	0	3.7	13	110	M	M	2	13	M	M		
Aug	16	90	73	82	2	0	17	T	0.0	0	4.8	20	20	M	M	2	3	28	20		
	17	91	72	82	2	0	17	0.30	0.0	0	5.3	16	20	M	M	3	13	M	M		
	21	89	78	84	4	0	19	0.41	0.0	0	7.5	16	260	M	M	3	13	21	250		
	28	91	78	85	5	0	20	0.02	0.0	0	5.6	15	330	M	M	2	8	24	330		
	31	90	78	84	4	0	19	T	0.0	0	4.8	10	200	M	M	3	38	M	M		
	5	89	78	84	4	0	19	0.05	0.0	0	4.7	12	30	M	M	4	13	M	M		
Aug	12	82	73	78	-2	0	13	3.28	0.0	0	6.8	14	150	M	M	4	138	22	170		
	13	91	75	83	3	0	18	0.31	0.0	0	6.2	18	110	M	M	3	13	24	120		

Trap Catch Comparison:

The mean numbers of mosquitoes caught by trap are presented in Figure 1. The Mosquito Magnet Liberty trap statistically collected significantly ($p < 0.05$) more mosquitoes than any of the other traps. On average, it collected at least 2X the number of mosquitoes compared to the second tier of traps composed of the Blue Rhino Skeeter-Vac, Applica Sonic Web and Mosquito Magnet Defender. There were no statistically significant ($p < 0.05$) differences in the collection rates of the three latter traps, nor were there any significant differences ($p > 0.05$) in the numbers collected among the Sonic Web, Defender and Lentek Mosquito Trap. The Coleman Deleto and the Lentek Eco-Trap caught significantly ($p < 0.05$) fewer mosquitoes than any of the other traps.

Nine different species of biting midges (a.k.a., no-see-ums, sand flies, biting gnats) were trapped including: *Culicoides furens*, *Culicoides mississippiensis*, *Culicoides meleus*, *Culicoides haemotopotus*, *Culicoides spinosus*, *Culicoides stellifer*, *Culicoides insignis*, *Culicoides travisi* and *Culicoides edeni*. The mean numbers are presented in Figure 2. The Mosquito Magnet Liberty caught the most followed by the Applica Sonic Web. Statistical differences were not calculated on the means because the variation exceeding the means in most instances. These data are provided simply to note the general trend in numbers collected per trap.

The mosquito species compositions for the various traps are presented in Figs. 3-9. The greatest species diversity was found in the traps that collected the most mosquitoes. The Mosquito Magnet Liberty and the Blue Rhino Skeeter Vac led all other traps with 19 species, while the Mosquito Magnet Defender and Sonic Web collected 17 and 16 species, respectively. The other traps collected 12-13 species. The numbers of each species collected varied among traps; however, the predominant species included: *Anopheles crucians*, *Aedes taeniorhynchus*, *Culex nigripalpus*, *Ochlerotatus infirmatus*, *Ochlerotatus atlanticus*, *Aedes aegypti* and *Culex quinquefasciatus*.

Fig. 1. Mean number of mosquitoes and 95% confidence limits caught by trap (n=21; different letters represent statistically significant differences at p=0.05).

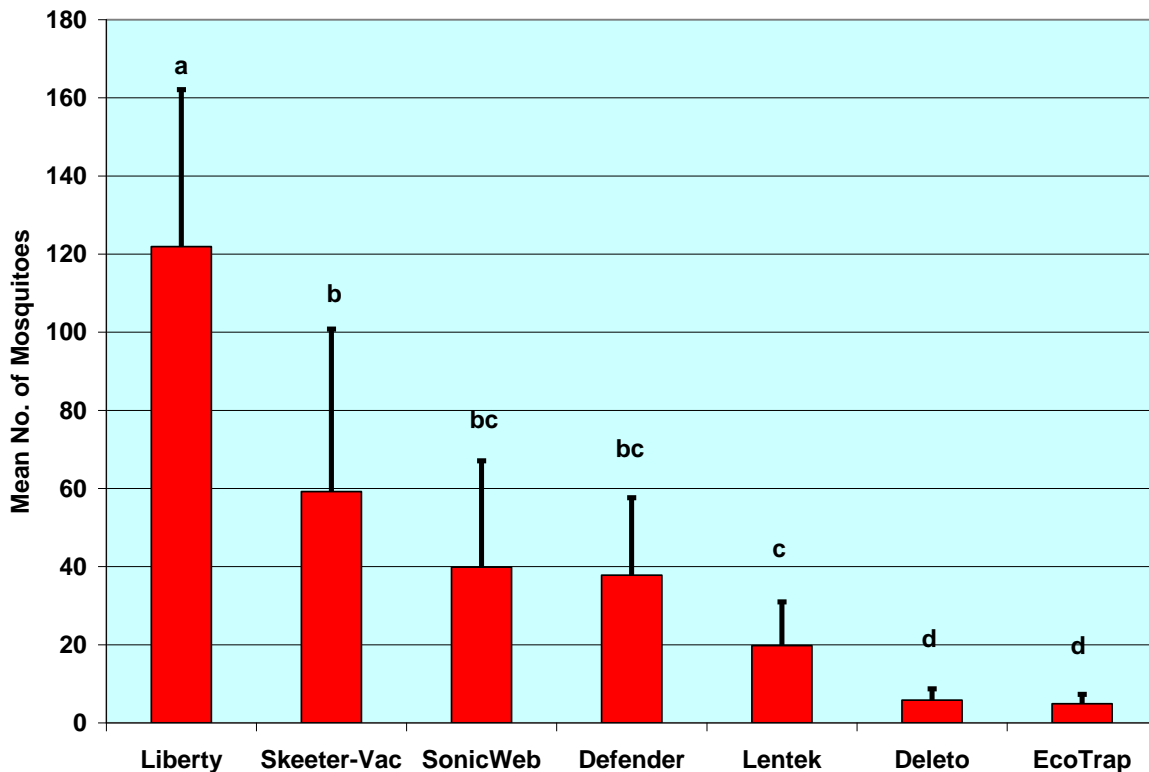


Fig. 2. Mean number of biting midges caught by trap (n=21).

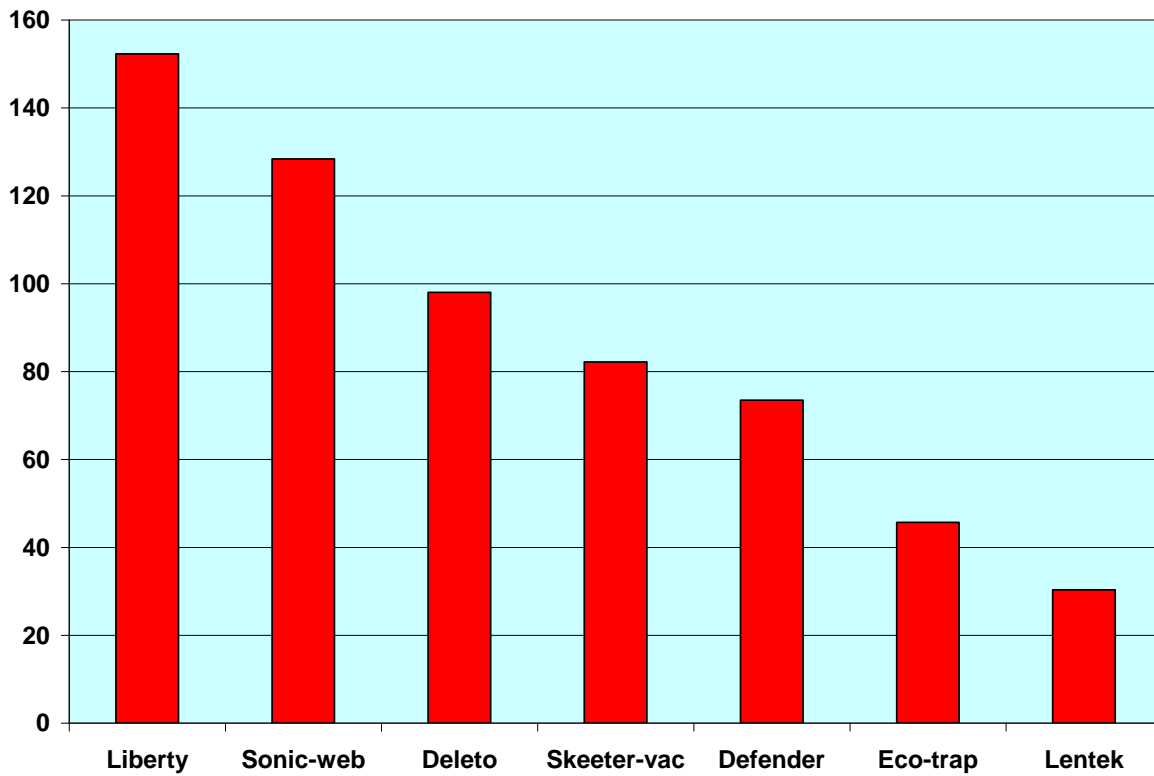


Fig. 3. Mosquito species composition and number caught by Mosquito Magnet Liberty trap.

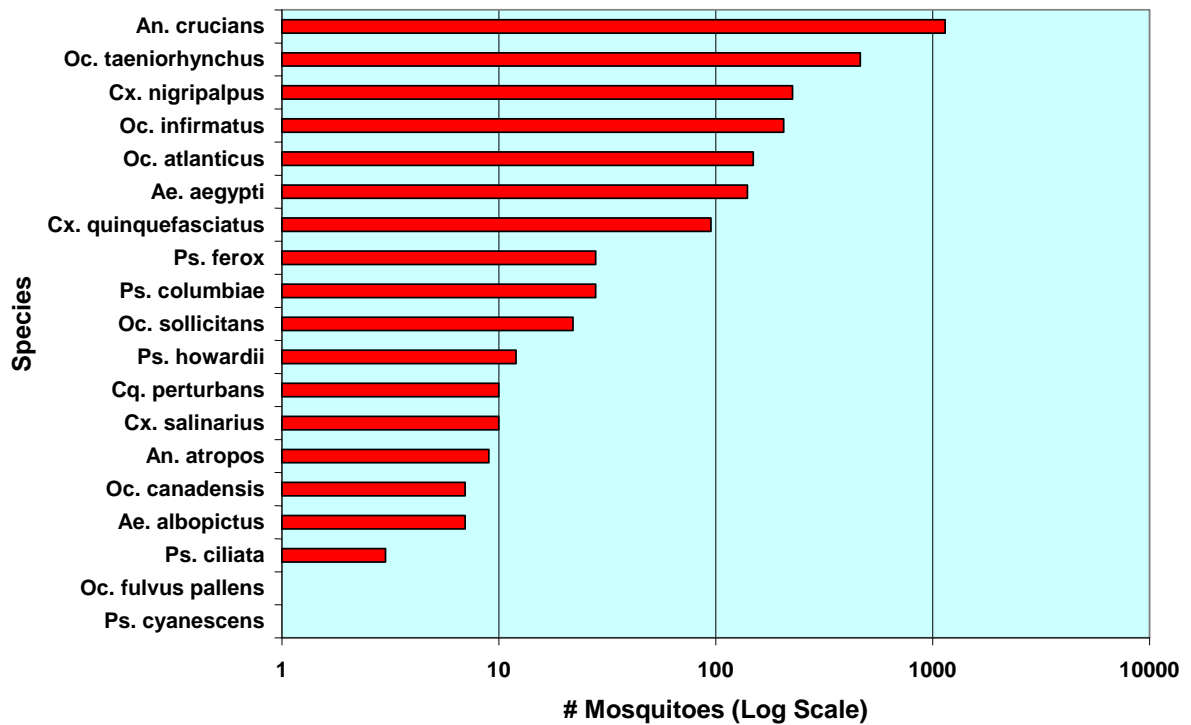


Fig. 4. Mosquito species composition and number caught by Blue Rhino Skeeter-vac trap.

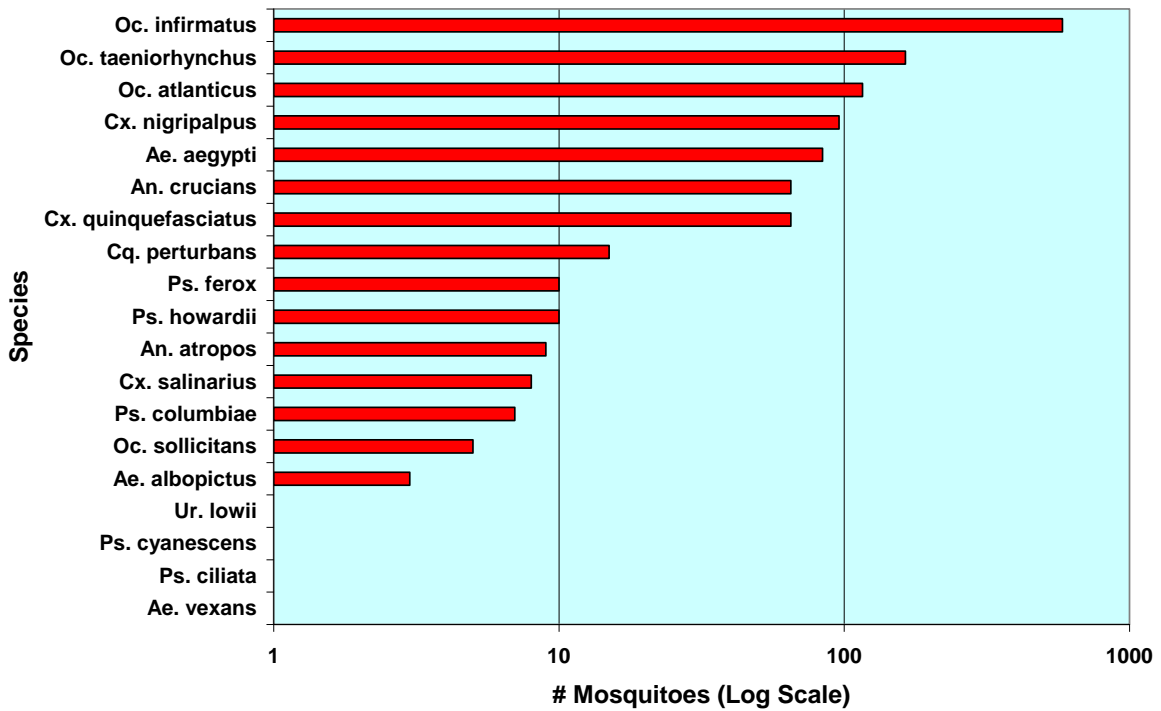


Fig. 5. Mosquito species composition and number caught by Sonic-Web trap.

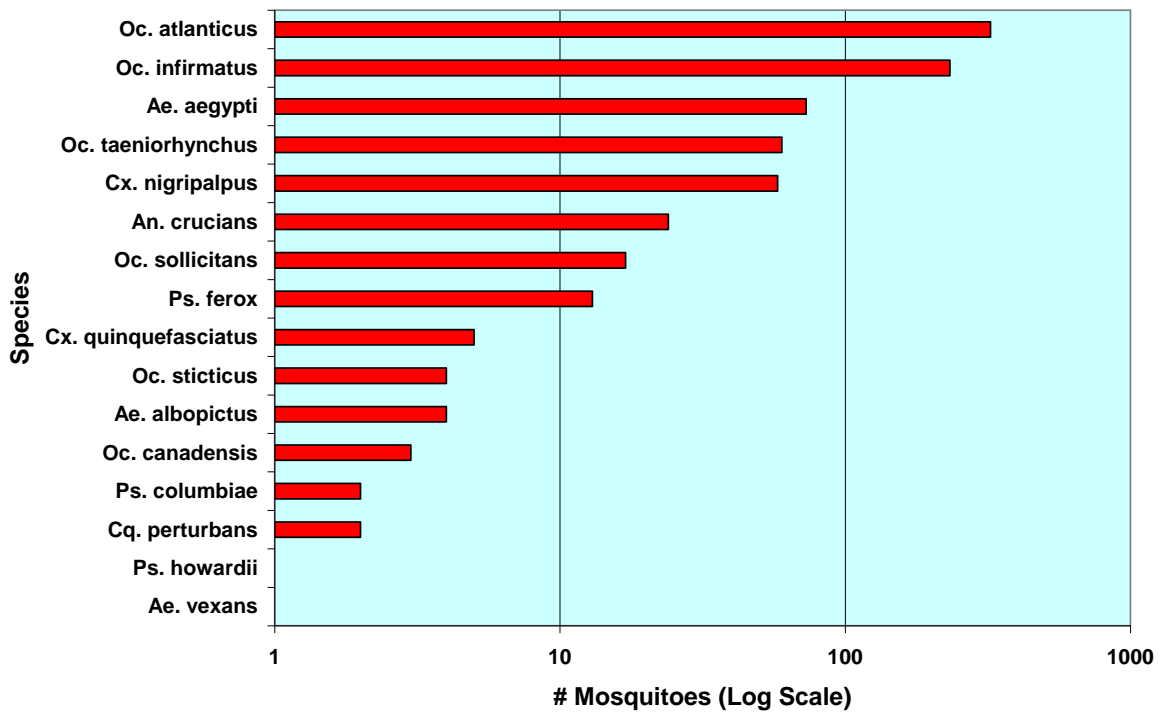


Fig. 6. Mosquito species composition and number caught by Mosquito Magnet Defender trap.

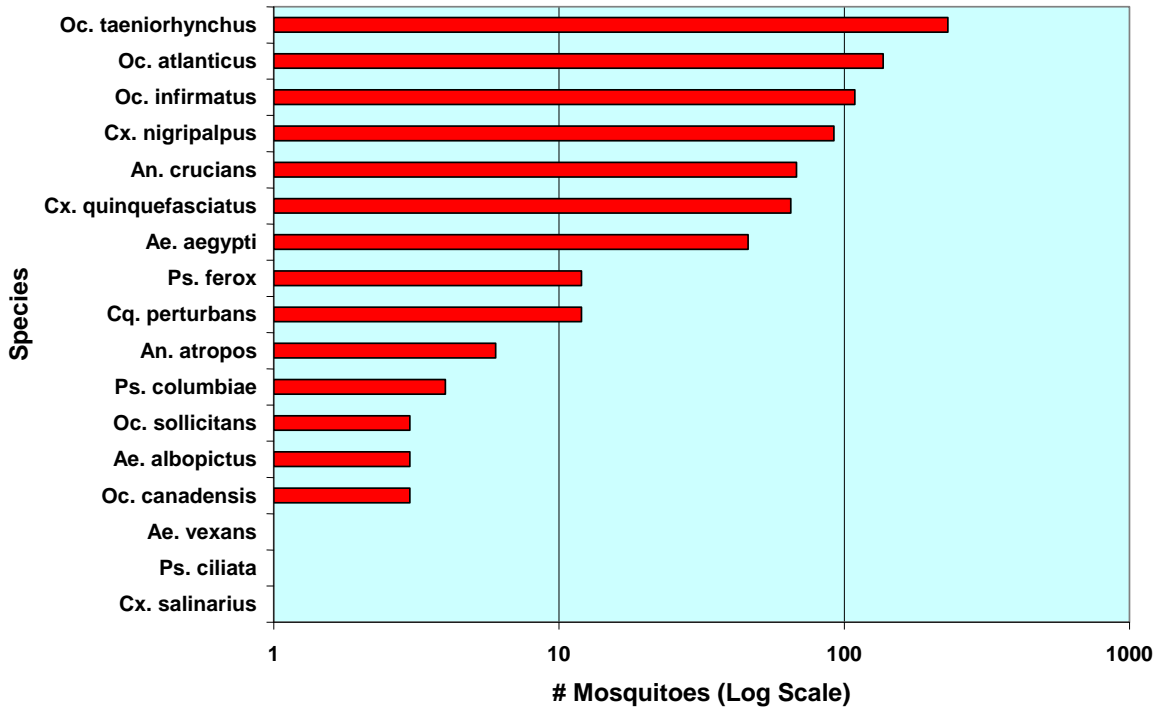


Fig.7. Mosquito species composition and number caught by Lentek Mosquito Trap.

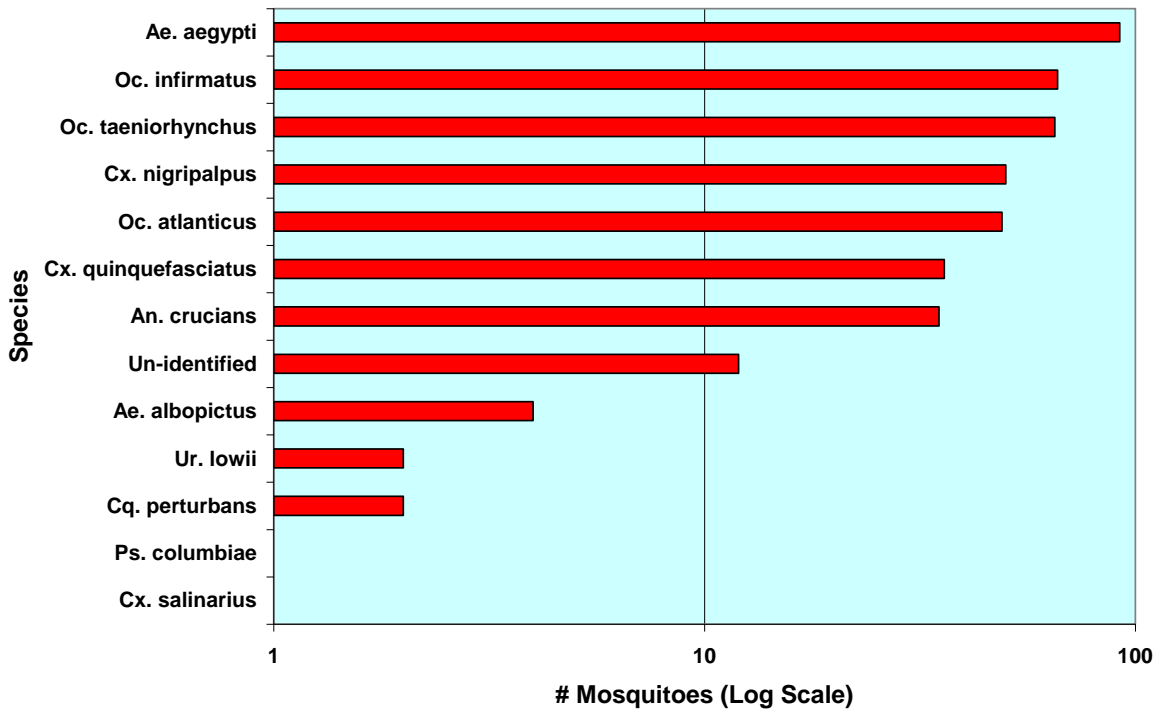


Fig. 8. Mosquito species composition and number caught in Coleman Mosquito Deleto trap.

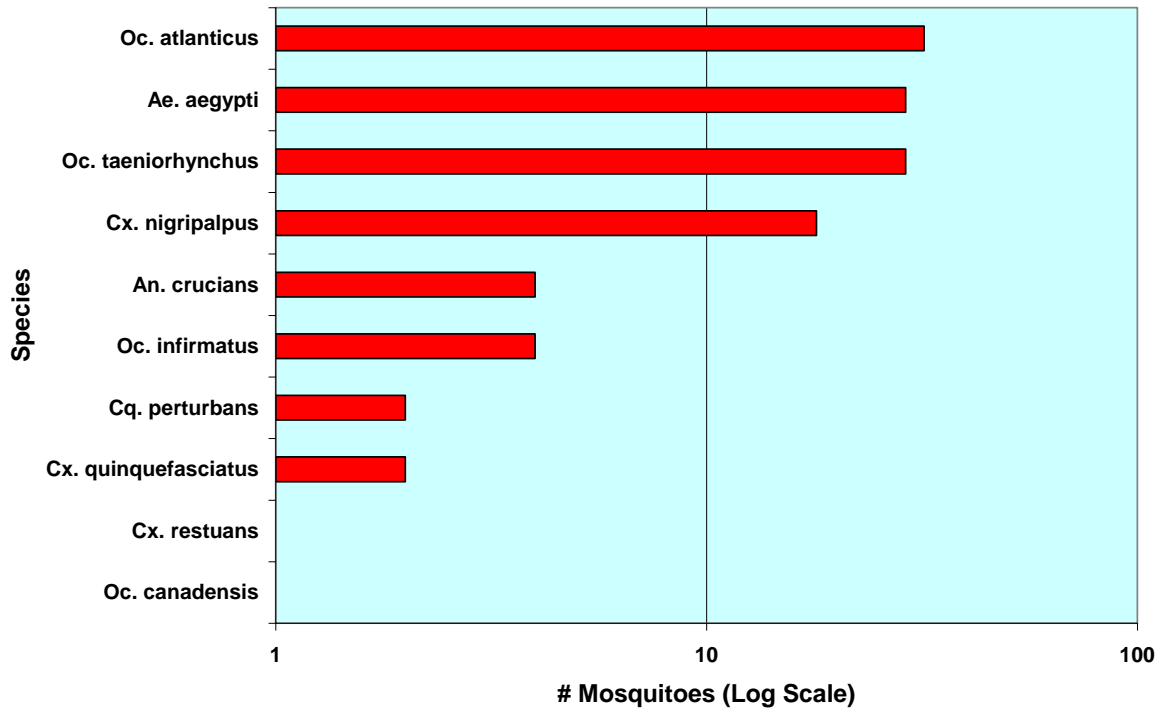
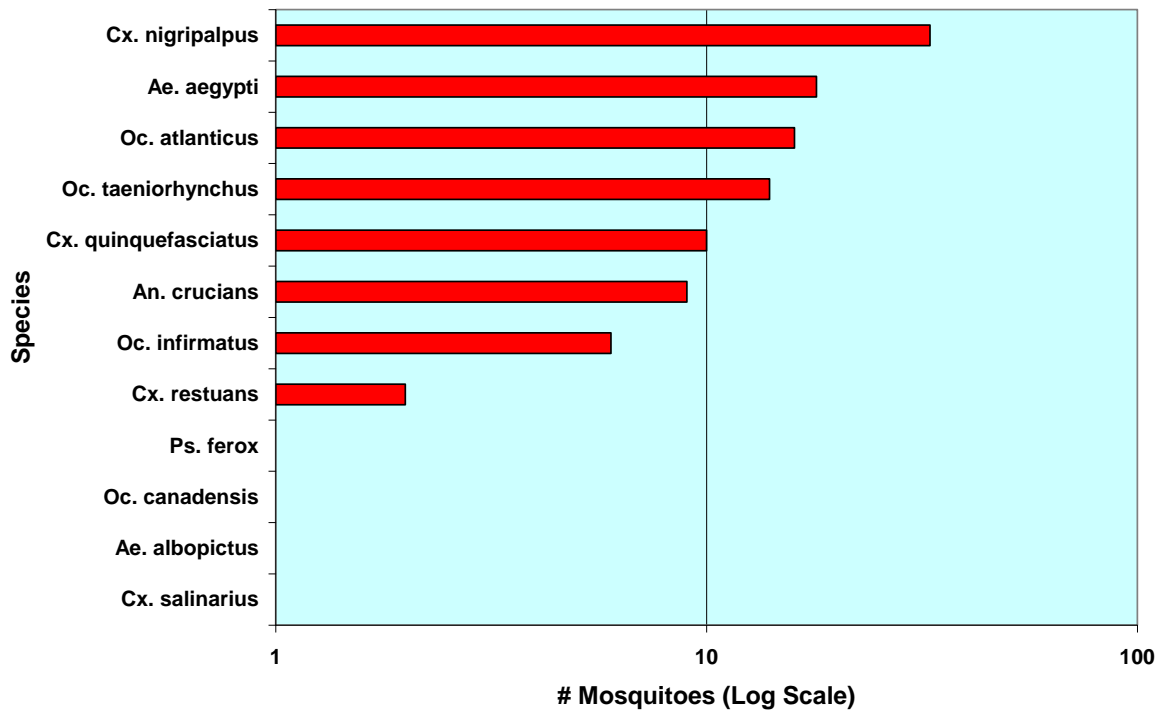


Fig. 9. Mosquito species composition and number caught in Lentek Eco-Trap.



Operational Notes:

The Applica Sonic Web, Coleman Deleto and Lentek Eco-Trap employed sticky panels to capture mosquitoes, whereas the other traps used fan systems to vacuum mosquitoes into collection bags. Specimens counted for the sticky panel traps were only those that actually stuck to the panels. It is possible that some portion of the trapped mosquitoes/midges on the sticky panels escaped injured yet did not survive. We had no way to measure this phenomenon. The Lentek Eco-Trap uses fermenting yeast to generate carbon dioxide attractant. It appeared as though most of the odor occurred immediately after the attractant substance was mixed with water. Consequently, it likely operated in a deficit compared to the other traps that had a more uniform release of attractants. We also had difficulty with raccoons and other animals attracted to the yeast mixture in the Eco-Trap. For this reason, we hung the trap about 3 ft from the ground within limits set in the manufacturer's instructions. Our experience with other traps has shown height can make a difference in collection results. The Eco-Trap may have worked better at a lower height; however, a mechanism needs to be devised to exclude animals without interfering with the traps operation.