FINAL REPORT

2005 SUNAIM, INC. MOSQUITO TRAP EVALUATION STUDY

Sponsored in part by:

Sunaim, Inc.
Dr. Osamu Arki, Manager
Planning & Development
9F Fukuoka Bldg.
1-11-17, tenjin, Chuo-ku
Fukuoka, 810-0001 Japan

Prepared by:

John P. Smith, Ph.D., B.C.E.
Professor of Entomology & Director
JAMS Public Health Entomology Research & Education Center
Florida A&M University
4000 Frankford Avenue
Panama City, Florida 32405-1933
smith_j@popmail.firn.edu
(850) 872-4184 X23

Study Participants:
Dr. John Smith
Mr. Jimmy Walsh
Mr. Eric Cope

September 23, 2005

PURPOSE[1]

The aim of this study was to compare the mosquito-trapping prowess of the Sunaim, Inc. Mosquitoll with American Biophysics Corporation Mosquito Magnet Liberty. This study was designed to compare the numbers and species caught and not to 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 Mosquitoll and Mosquito Magnet Liberty (hereafter referred to as Liberty) were randomly assigned one trap/location to two sites separated by a distance of over 300 ft. The Mosquitoll was operated from 3:00 p.m. until 8:00 a.m. C.T. the following morning. The Liberty trap was operated continuously 24/7 per manufacturer's directions; however, a new collection bag was placed in the trap during the same time the Mosquitoll trap operated. Both traps employed CO_2 and octenol as attractants according to manufacturer design and provision. CO_2 in the Liberty was generated through propane combustion while compressed gas in a 5 lb. cylinder was used for the Mosquitoll. The amount of CO_2 used in the Mosquitoll was measured by weighing the cylinder after each day. The traps were rotated back and forth between the two trapping sites in a Latin-square design until three good replications were obtained. A complete rotation through both trapping sites was considered a replication. Trap runs were repeated any time equipment failure, unsuitable weather or poor catch occurred. Thus, each trap operated a total of six times, three times per trap site. Good trap runs were conducted on August 10, 11, 12, 15, 17 & 23, 2005. Trap contents were collected each morning around 8 a.m., sorted, identified to species, counted and entered into an EXCEL database. Weather data were recorded for each day of the study from the Panama City International Airport located within a half mile from the study site.

Data Analysis:

Total mosquitoes collected by trap and species abundance by trap were charted using Microsoft Excel 2000 pivot tables and charting functions. Analysis of variance was conducted on log-transformed data and tested for statistical differences between traps using SAS PC.

RESULTS

Environmental Data:

Conditions during the study are presented in Table 1. Temperatures were very consistent with averages mostly in the 80's (range from 82 to 85^{o}F). There was no rainfall except on Aug. 15 & 23. 1.5 inches fell on the 15th; however, most fell during the non-testing hours. Only a trace amount of rain fell during the 23rd. Wind

[1] The findings in this report do not represent an endorsement or recommendation for or against the traps tested, referred to, or not mentioned in this study by Florida A&M University.

speed averaged just over 4 mph for each day of testing. The wind was from the southwest, except on Aug. 15 & 23 when it shifted from the northeast and southeast, respectively. Although not indicated in the table, humidity averaged between 70-80%. In general, conditions were ideal for the trap study.

Table 1. Climatological data for each day traps were operated during 2005 Sunaim, Inc. trapping study.

LOCAL CLIMATOLOGICAL DATA FROM PANAMA CITY AIRPORT (SOURCE: NOAA)

STATION: PANAMA CITY
MONTH: AUG
YEAR: 2005
LATITUDE: 30 12 N
LONGITUDE: 85 41 W

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
										AVG	MX	2MIN						
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
10	90	78	84	4	0	19	T	0.0	0	4.1	12	250	M	M	2	138	16	240
11	91	78	85	5	0	20	0.00	0.0	0	4.4	12	270	M	M	3	18	14	250
12	91	78	85	5	0	20	0.00	0.0	0	4.3	14	250	M	M	3	18	16	270
15	90	73	82	2	0	17	1.59	0.0	0	4.3	30	20	M	M	3	138	33	20
17	93	76	85	5	0	20	0.00	0.0	0	4.1	13	250	M	M	1	18	16	250
23	91	76	84	4	0	19	0.23	0.0	0	4.8	7	140	M	M	2	38	9	120

CO_2 usage in the Mosquitoll was relatively consistent throughout the study (Table 2). The target flow rate was 300 ml / minute. Total daily CO_2 consumption ranged from 0.6 to 0.9 lbs for each 17-hour trapping period.

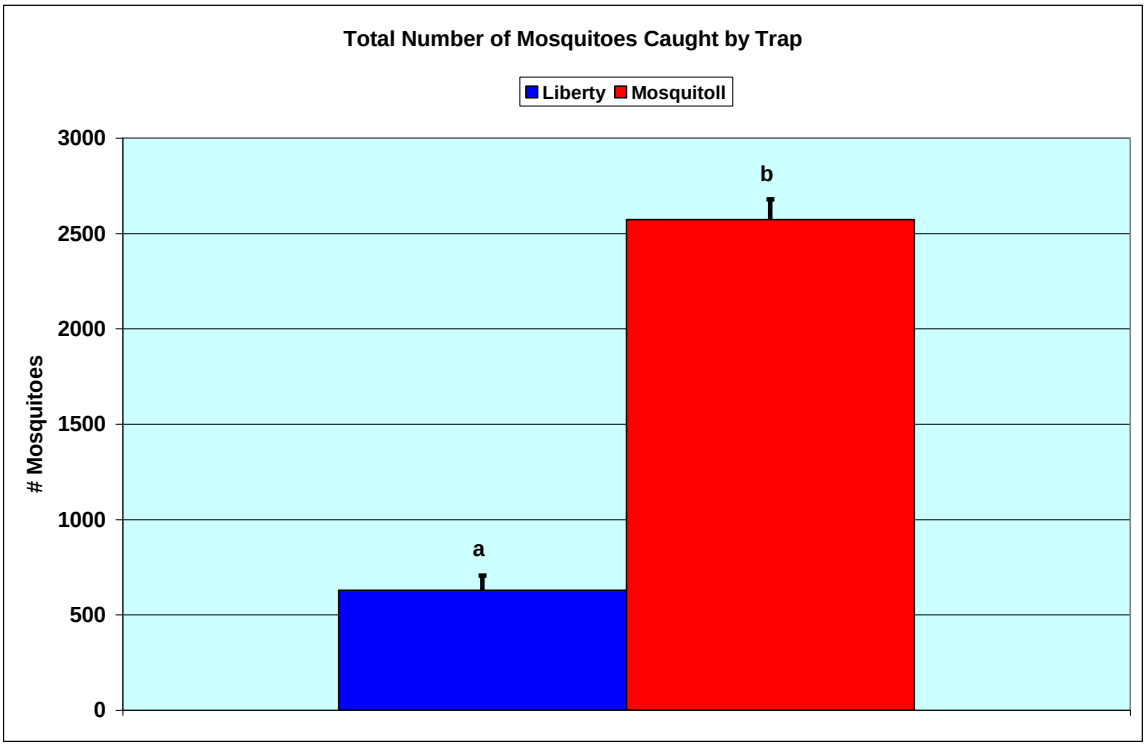
Table 2. Daily CO_2 usage in the Mosquitoll trap.

Trap Date	CO_2 Usage (#s)
8/10/05	0.6
8/11/05	0.8
8/12/05	0.9
8/15/05	0.8
8/17/05	0.7
8/23/05	0.6

Trap Catch Comparison:

The total number of mosquitoes caught by trap is presented in Figure 1. The Mosquitoll trap collected significantly ($p<0.0007$) more mosquitoes than the Liberty. On average, it collected 4X the number caught in the Liberty, regardless of trapping location. There was no significant difference ($p>0.05$) in total number of mosquitoes caught among trapping sites or days.

Fig. 1. Total number of mosquitoes caught and 95% confidence limits by trap (n=6; different letters represent statistically significant differences at p<0.0007).



Species composition for the two traps is presented in Figures 2 & 3. Mosquitoll collected 13 species while the Liberty collected 11. The predominant species i.e., *Anopheles crucians*, *Ochlerotatus taeniorhynchus*, *Ochlerotatus sollicitans* and *Culex quinquefasciatus* were captured in both traps. Interestingly, Culex nigripalpus, the primary vector of St. Louis encephalitis in Florida, was not collected in the Mosquitoll; however, was collected in moderate numbers in the Liberty. Additionally, *Culex restuans* was also trapped in the Liberty and not the Mosquitoll. In contrast, the Mosquitoll caught four species not collected in the Liberty, *Ochlerotatus infirmatus*, *Coquilletidia perturbans*, *Psorophora ciliata* and *Anopheles quadrimaculatus*.

Fig. 2. Mosquito species composition and number caught by the Mosquitoll.

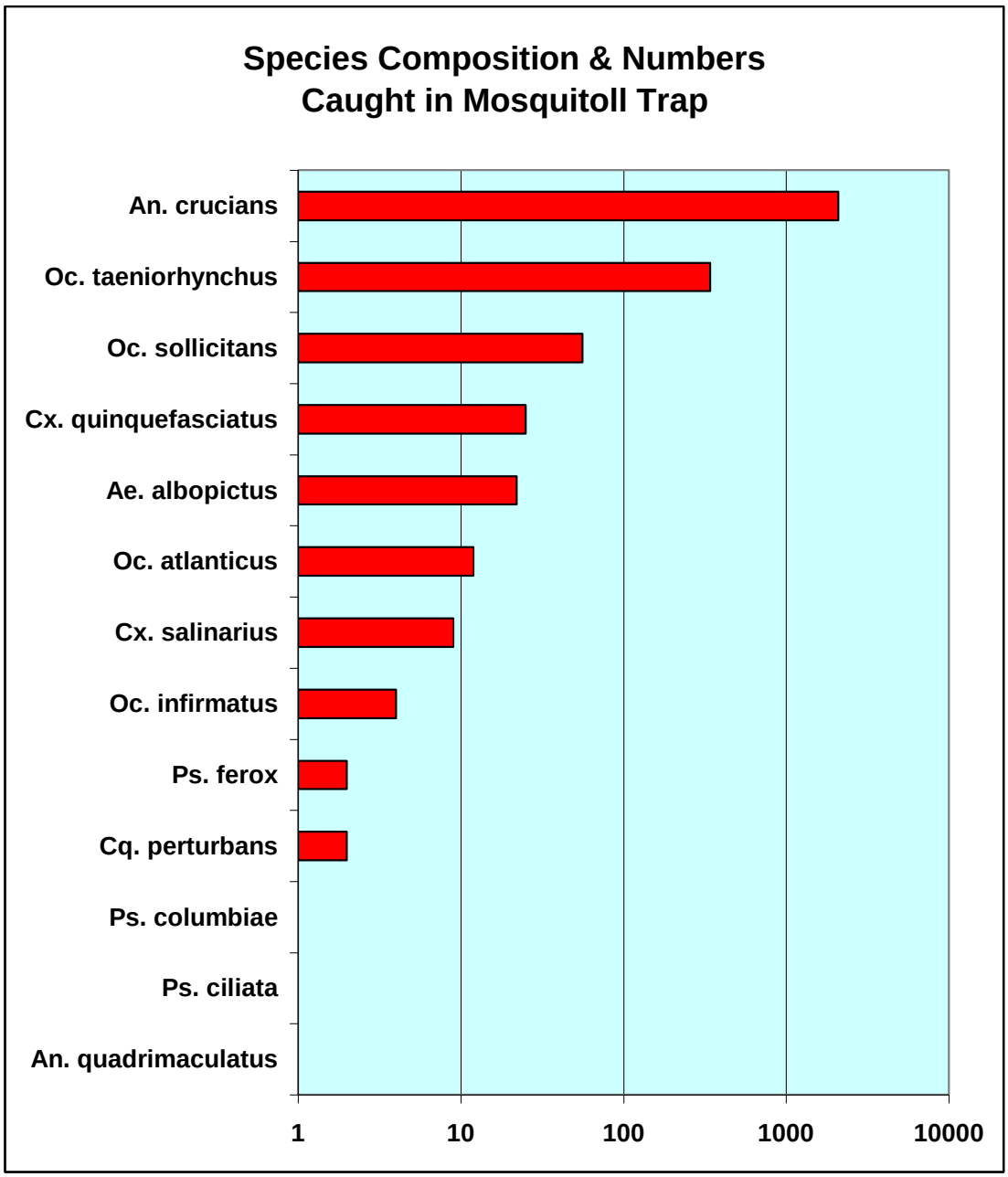
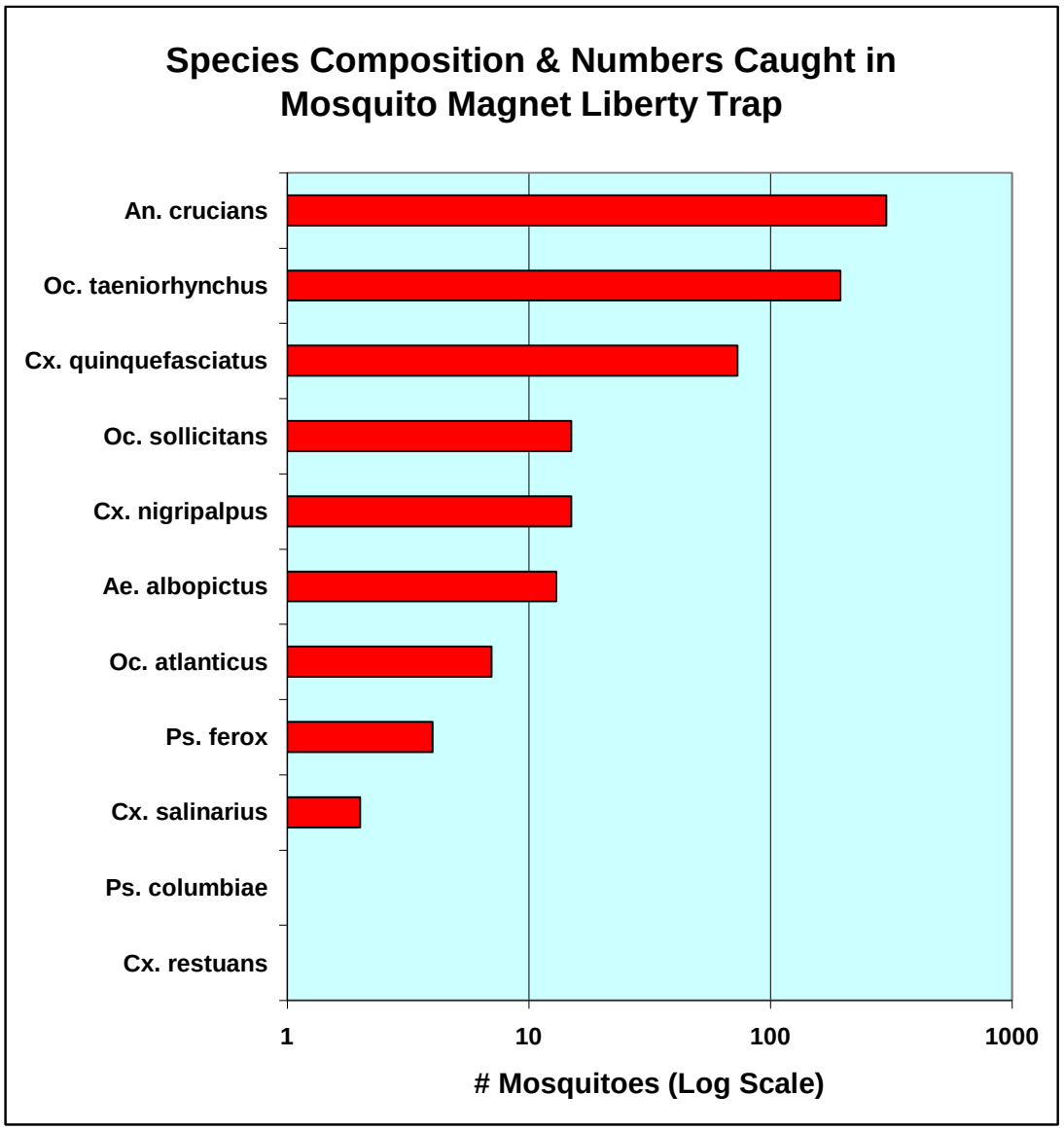


Fig. 3. Mosquito species composition and number caught by the Mosquito Magnet Liberty.



CONCLUSIONS

In similar, but separate studies conducted at PHEREC, the Mosquito Magnet Liberty caught 1.5X fewer mosquitoes than did the Mosquito Magnet Pro Trap. However, the Mosquito Magnet X trap caught just over 4X more than the Liberty. The latter two traps were not tested in this study, thus, it is not possible to make direct comparisons because environmental conditions may have been different. Assuming conditions were equivalent, data from those studies imply the Mosquitoll would collect more mosquitoes than the Mosquito Magnet Pro and would be equivalent to the Mosquito Magnet X trap. American Biophysics Corporation does not market the X trap to consumers other than mosquito control professionals at this time. That being said, one would surmise the Mosquitoll has the potential to capture

more mosquitoes than any other commercial trap we have tested. Of course, more studies are needed to corroborate this assumption. One major draw back to the Mosquitoll trap is that it requires compressed CO_2. This may be a significant impediment since most consumers in the U.S. are not familiar with handling CO_2. Additionally, compressed CO_2 is not widely available particularly in the rural U.S.