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Confessions of a termite researcher who stuck a toe into the realm of backyard mosquito control

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FIRST OBJECTIVE

To compare adult sampling methods at a single site

LSWV36 Black & Decker 36V Lithium Hard Surface Sweeper Vac

MOSQUITO SAMPLING SITE AS IT APPEARED AUGUST 2013 THROUGH APRIL 2015

MOSQUITO SAMPLING SITE AS IT APPEARED (MAY THROUGH NOVEMBER 2015)

A SCREENSHOT IMAGE FROM GOOGLE MAPS IN 2012 SHOWING THE LAYOUT OF THE COURTYARD, THE MAJOR LANDSCAPE FEATURES AND THE NORTH OCONEE RIVER IN THE VICINITY

MOSQUITOES CAUGHT IN 2013/2014/2015 BY ALL METHODS

Aedes albopictus(4428/2778/456)

Ochlerotatus japonicus(28/16/20)

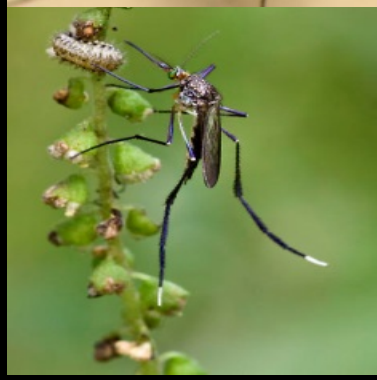
Culex restuans (36/58/51)

Aedes vexans (58/7/13)

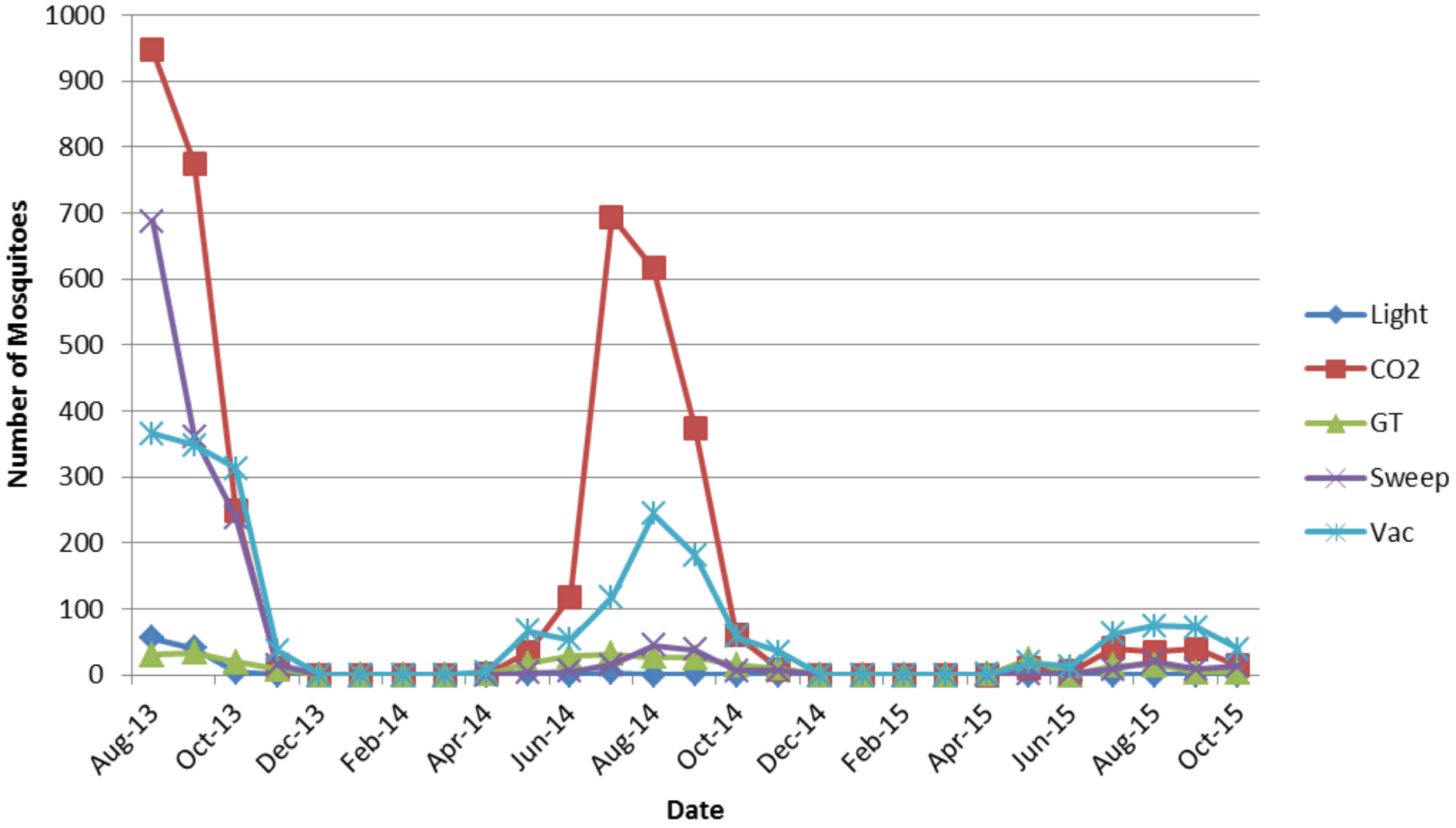
Anopheles punctipennis(7/45/3)

Culex quinquefasciatus (0/70/13)

Psorophora ferox (2/0/2)



COURTYARD SAMPLING DATA: MONTHLY TOTAL ABUNDANCE OF MOSQUITOES CAUGHT BY SAMPLING METHOD



LINEAR REGRESSION ANALYSIS 2013/2014/2015

Device	CDC with CO_2	Model Equation
CDC with CO_2	☰	
Gravid Trap	1:21 1:12 **1:2**	$CO_2 = exp[2.7851 + 0.05447(LGT)]$ $CO_2 = exp[1.8937 + 0.7328(LGT)]$ $CO_2 = exp[0.0340+0.5128(LGT)]$
Sweep	1:20 1:20 **1:3**	$CO_2 = exp[0.2623 + 1.0532(LSweep)]$ $CO_2 = exp[2.5610 + 0.0339(LSweep)]$ $CO_2 = exp[0.0329+0.7626(LSweep)]$
Vacuum	1:2 1:2 **2:1**	$CO_2 = exp[1.1344 + 0.0431(LVacuum)]$ $CO_2 = exp[1.2938 + 0.8339(LVacuum)]$ $CO_2 = exp[0.0329+0.56169(LVacuum)]$

MOSQUITO SPECIES CAUGHT, BY METHOD, OVER 31 MONTHS OF SAMPLING

Mosquito Species	CDC light trap with CO_2	Vacuum	Gravid	Sweep	CDC light trap	Total per species
Aedes albopictus	3910	2008	189	1453	102	7662
Ochlerotatus japonicus	14	36	1	13		64
Culex restuans	32	27	73	13		145
Aedes vexans	15	32	14	13	4	78
Anopheles punctipennis	55					55
Culex quinquefasciatus	11	29	42	1		83
Psorophora ferox		3			1	4
Total per method	**4037**	**2135**	**319**	**1493**	**107**	**8091**

NUMBER & PROPORTION OF *Aedes albopictus* FEMALES CAUGHT BY DEVICE PER YEAR

2013 / 2014 / 2015

Device	No. of Females	% Female
CDC Light Trap with CO_2	1824 1655 130	92 90 93
CDC Light Trap	82 9 -	85 85 -
Gravid Trap	40 71 13	56 76 55
Sweep	816 78 41	63 62 72
Vacuum	880 326 104	64 57 55

RESIDENTIAL MOSQUITO CONTROL EFFICACY STUDIES

SECOND OBJECTIVE

2 Pest Control companies
in Athens and Atlanta, GA

30 total Trt houses

23/24 total control houses

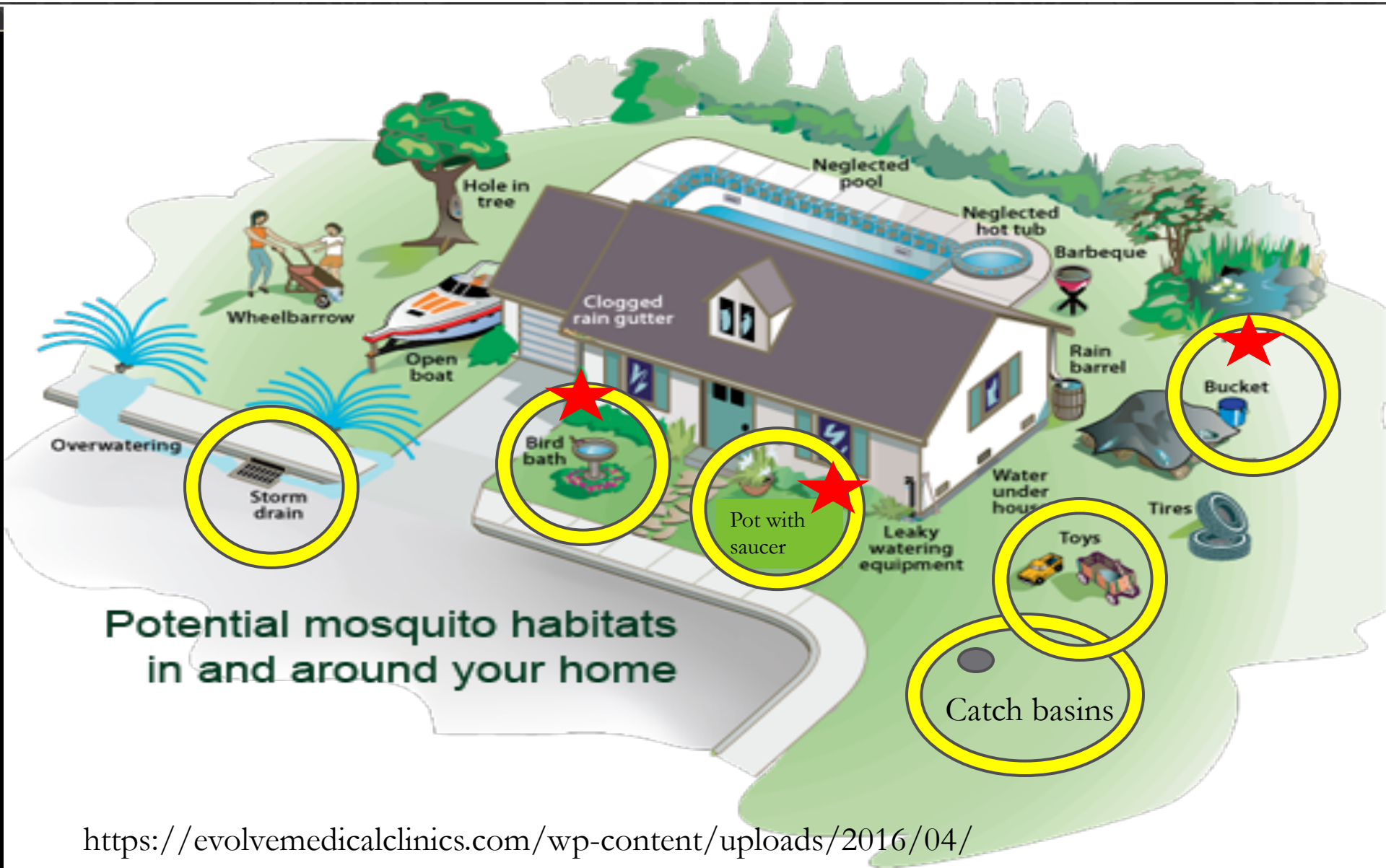
2 pyrethroid insecticides:
bifenthrin or esfenvalerate

PMP technician treatment 1x/month
with backpack mist blower

Mosquito sampling 2x/month
(July – Oct)

Vacuum sampling device

POTENTIAL AND ACTIVE BREEDING SITES FOUND DURING THE PMP SHADOWING STUDY HIGHLIGHTED WITH RED STARS



https://evolvemedicalclinics.com/wp-content/uploads/2016/04/

RESIDENTIAL MOSQUITO CONTROL EFFICACY STUDIES

2014

30 treatment Properties– 2 with mosquitos

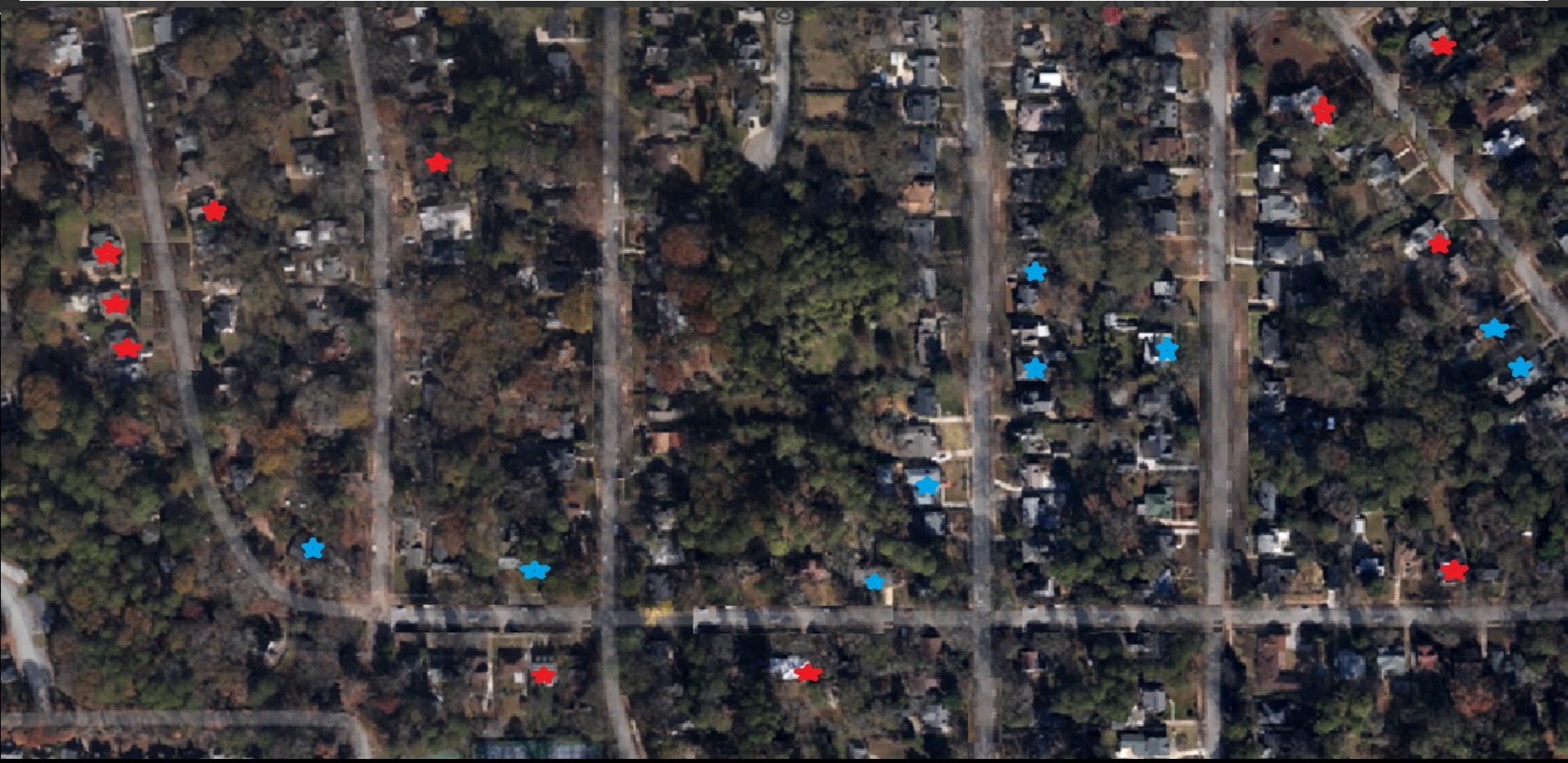
23 control homes – 8 with mosquitos

2015

30 treatment homes – 0 mosquitos

24 control homes – 5 with mosquitos

RESIDENTIAL MOSQUITO CONTROL EFFICACY STUDIES



Treatment Homes
2014 – 7% in 2015 - 0

Control Homes 2014 (8/23) 35% with mosquitoes
2015 (5/24) 20% with mosquitoes

Survey

1. When are you most likely to be outdoors? (Treatment responses %/control responses%)

Early morning (47%/67%) Noon(13/17)

Afternoon(63/50) Evening(97/79)

Statistical significance:
<0.05 = *
<0.01= **
<0.001 = ***

2. How many hours per day do you spend outside?

less than 1 hour(20/38) 1-2 hours(30/25)

more than 2 hours(50/38)

3. In your opinion, has the mosquito problem gotten better, worse, or has it remained the same in the past 2 years?

Better (1/0) Worse(1/38) Same(80/63)

4. How many mosquito bites a night would you tolerate in your backyard before you would consider having your yard treated?

Treatment homes:

Intolerance: 100% (***)

"We always get our yard treated on a monthly basis" (10%)

Control homes

Tolerance: 100% (***)

"It doesn't matter, because I would never treat my yard." (13%)

RESIDENTIAL MOSQUITO CONTROL EFFICACY STUDIES

- 9 Houses; 2014
- 15 Houses; 2015
- 3 houses per Treatment
- Treated by our laboratory using backpack mist blowers
- Vacuuming sampling device
- Mosquito sampling @ 2 week intervals after Treatment.

BRAND NAMES AND ACTIVE INGREDIENTS OF THE PRODUCTS OF STUDY

BRAND NAME A.I.	Talstar®: **(bifenthrin)**	Suspend®: **(deltamethrin)**	Mosquito Free™: **(cedar oil)**
BRAND NAME A.I.	All Clear®: **(garlic oil)**	Navoprit™: **(oil blend: soybean and corn oil)**	EcoSmart®: **(essential oils: thyme, peppermint, rosemary, clove)**

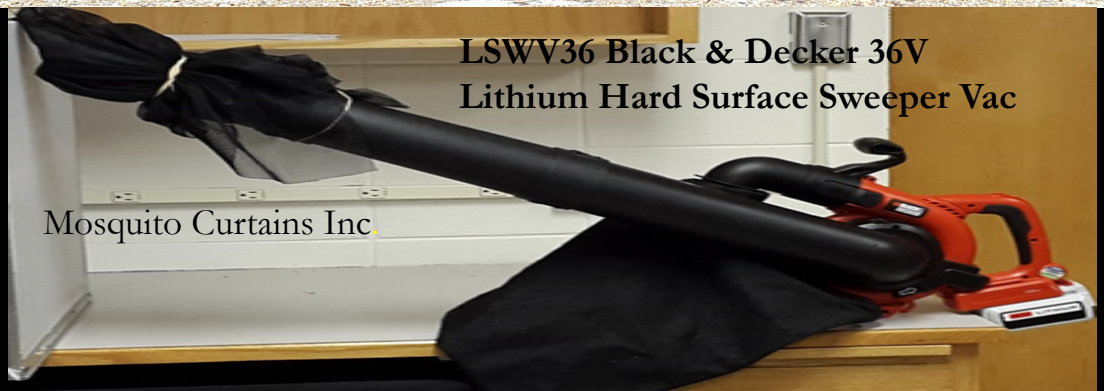
NUMBER OF MOSQUITOES CAUGHT WITH VACUUM SAMPLING by RESIDENCE and TREATMENT (2014) [30% w/ no mosquitos]

* Active larvae found	Bifenthrin			Deltamethrin			Control		
Residence	1	2	3	1	2	3	1	2	3
Week Post-trt									
Pre	11	-		6			-		
Pre	8	-		1	-		-	-	
Pre	10	-	2	5	-	-	-	-	-
Pre	6	-	2	3	-	-	-	-	-
1	1	-	-	1	-	-	-	-	-
2	4*	-	1	2	-	-	-	-	1
4	2*	-	1	-	-	-	-	-	2
6	6*	-	2	5	-	-	-	-	4
8	1*	-	3	2	-	-	-	-	-
10	2*	-	1	4	-	-	-	-	1
12	1	-	1	3	-	-	-	-	2
14	-	-	-	-	-	-	-	-	-

TOTAL NUMBER OF MOSQUITOES CAUGHT BY RESIDENCE AND TREATMENT PER SAMPLE DATE (2015) * active breeding site

Date	PRETREATMENT				
5/5/2015	-	-	-	2	-
5/22/2015	2*	1	-	1	-
6/3/2015	2*	1	1	1	1
6/16/2015	1*	1	-	1	-
6/30/2015	1*	1	-	1	-
7/13/2015	1*	2	-	1	-
7/28/2015	1*	1	-	1	-
8/14/2015	1	1	2	2	-
TREATMENT					
8/24/2015	Deltamethrin	Bifenthrin	Oil blend	Garlic Oil	Control
POST-TREATMENT					
8/25/2015	-	-	-	1	-
9/3/2015	-	-	2	3	-
9/17/2015	-	-	2	2	-
10/1/2015	2*	-	1	1	-
10/15/2015	1*	-	1	-	-
10/30/2015	1	-	1	-	-

BACKYARD MOSQUITO CONTROL



Backpack mister treatments with Pyrethroids were effective (4 weeks with no mosquitoes caught) as long as larvaciding was also part of the monthly treatment regime.

The 25B products were not effective at providing more than one week with no mosquitos caught.

The vacuum device is a useful tool for sampling foliage-resting mosquitos over large areas.

QUESTIONS? COMMENTS?

A fumigator sprays for mosquitoes in Canal Zone sometime between 1915 and 1920. Malaria and yellow fever carried by mosquitoes was a leading cause of death for Canal workers (Library of Congress)