

# A Unique, Lightweight, Dry Chemical CO<sub>2</sub> Source for Use in Mosquito Surveillance in Remote Areas



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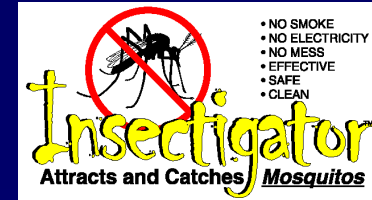
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# Specifications



## Description

## Small Sachet

## Large Sachet

Size (opened)

3 x 7 x ¼ inch

7 x 7 x ½ inch

CO<sub>2</sub> output

5-10 ml/min,  
60% 1<sup>st</sup> 24 hrs

20-40 ml/min,  
90% in 1<sup>st</sup> 24 hrs

Max output

0-8 hrs, or with different chemistries can be skewed to produce CO<sub>2</sub> max. levels at different times (i.e. 0-3 hrs, 8 hrs, 24 hrs)

Same

Duration

> 168 hrs at low levels (still attracts mosquitoes)

Not tested

# Specifications (continued)

Moisture is produced as by-product

Non-toxic unless eaten

Non-flammable

Environmental friendly

# How to Use *Insectigator*



Unclip



Shake



Tape

# Screen Cage Studies, WRAIR



**6 x 6 x 6 ft Screen Cage**



**Small *Insectigator* Sachet**



**Attaching sachet to trap  
after mixing contents**

- \* Added precounted *Ae. aegypti* and *An. stephensi*, closed zipper
- \* Wait 30 min or 1 hr until end of trial
- \* Removed mesh bag, froze, and counted mosquitoes caught

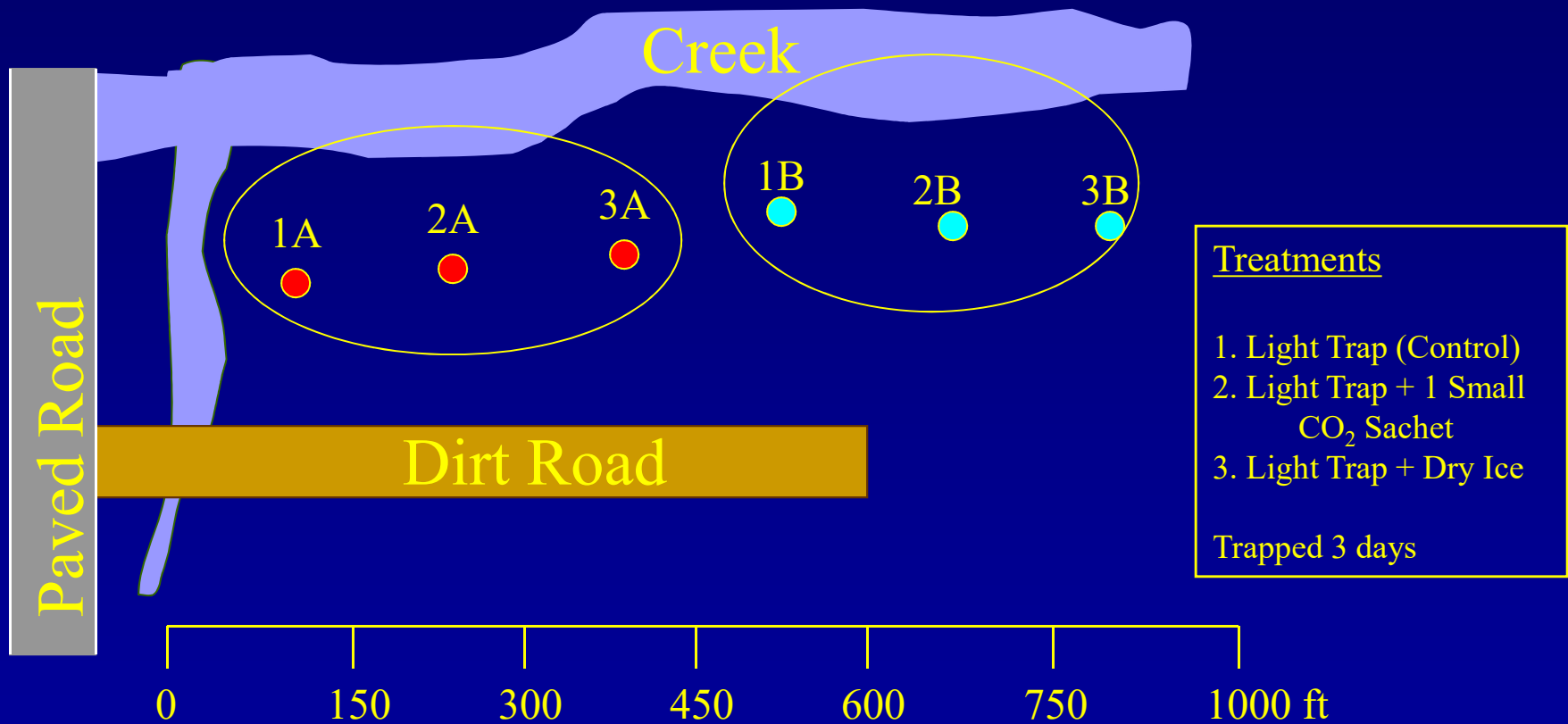
# Screen Cage Studies

<u>Treatments to Light Traps<sup>1</sup></u>	<u>Duration of Trials</u>	<u>No. Mosq. /Species/Trial</u>	<u>No. of Reps</u>	<u>% Mosquitoes Caught (Means + Std. Dev.)</u>	
				<u><i>Ae. aegypti</i></u>	<u><i>An. stephensi</i></u>
1. <i>Insectagator</i> CO <sub>2</sub> <sup>2</sup>	1 hr	40-50	22	77 ± 18	34 ± 12
2. <i>Insectagator</i> CO <sub>2</sub>	30 min	39-40	7	74 ± 12	--
3. Dry Ice (139 gm)	1 hr	50	1	86	--
4. No Treatment	1 hr	40-50	3	5.8 ± 10.3	22.3 ± 10.3
5. No Treatment	30 min	40	3	0	22.5

<sup>1</sup> CDC-type Light Traps with bulb on; <sup>2</sup> Small Sachets/Light Trap/Trial

<sup>2</sup> Rate of CO<sub>2</sub> Production: 1170 cu cm/min

# Field Study -- Anastasia Mosquito Control District, St. Augustine, FL



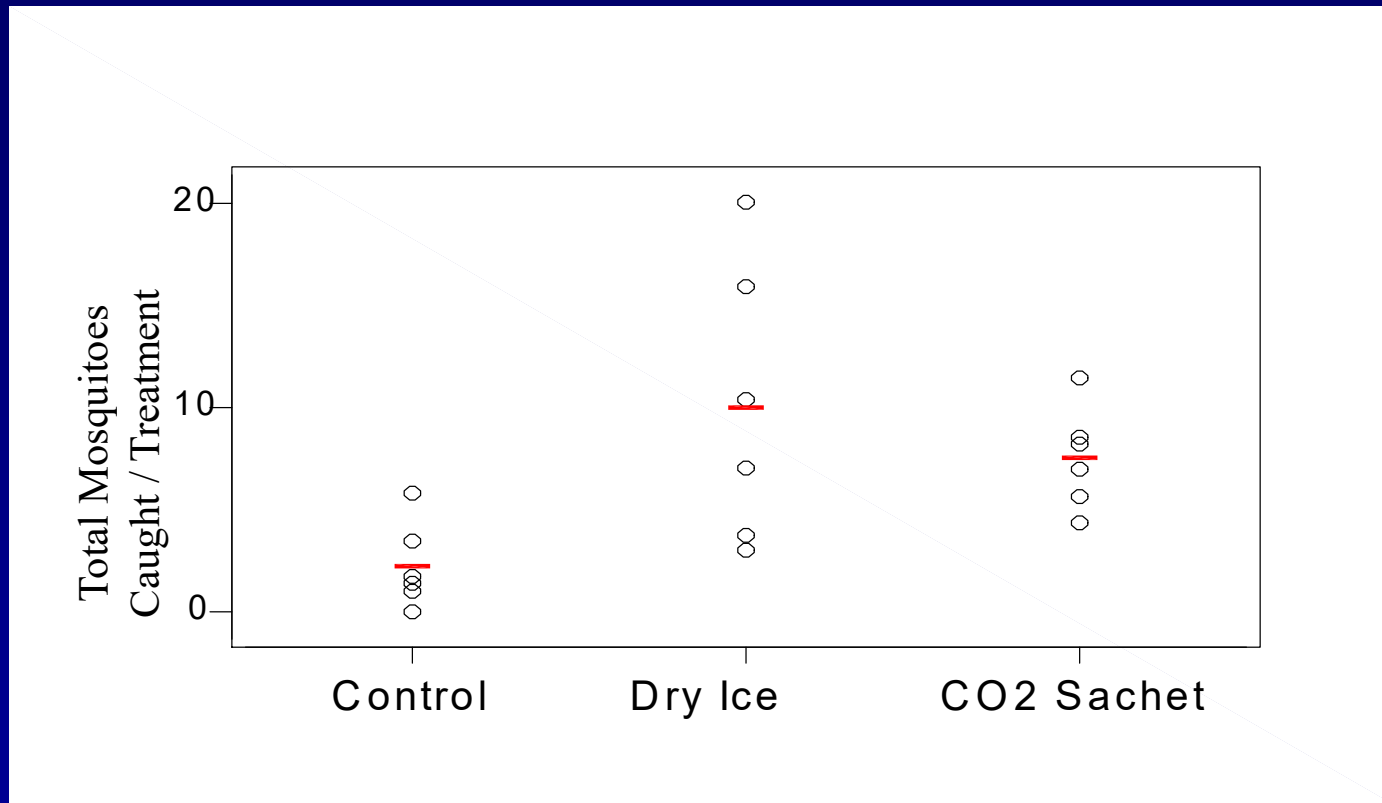
Study conducted by Dr. Ruide Xue, PhD, and B. Billet, Oct 6-10, 2003

# Mosquito Genera and Species Caught in FL Study

<i>Culex nigripalpus</i>	954
<i>Psorophora columbiae</i>	227
<i>Anopheles crucians</i>	28
<i>Oclerotatus infirmatus</i>	25
<i>Ochlerotatus atlanticus</i>	11
<i>Culisetta melanura</i>	12
<i>Uranotaenia lowii</i>	2
<i>Uranotaenia ciliata</i>	2
<i>Psorophera howardii</i>	1
<i>Culex erraticus</i>	1
others	2
	<hr/>
Total	1265



# Total Mosquitoes Caught by Different Treatments in FL Study



Used 1 small *Insectigator* Sachet/light trap

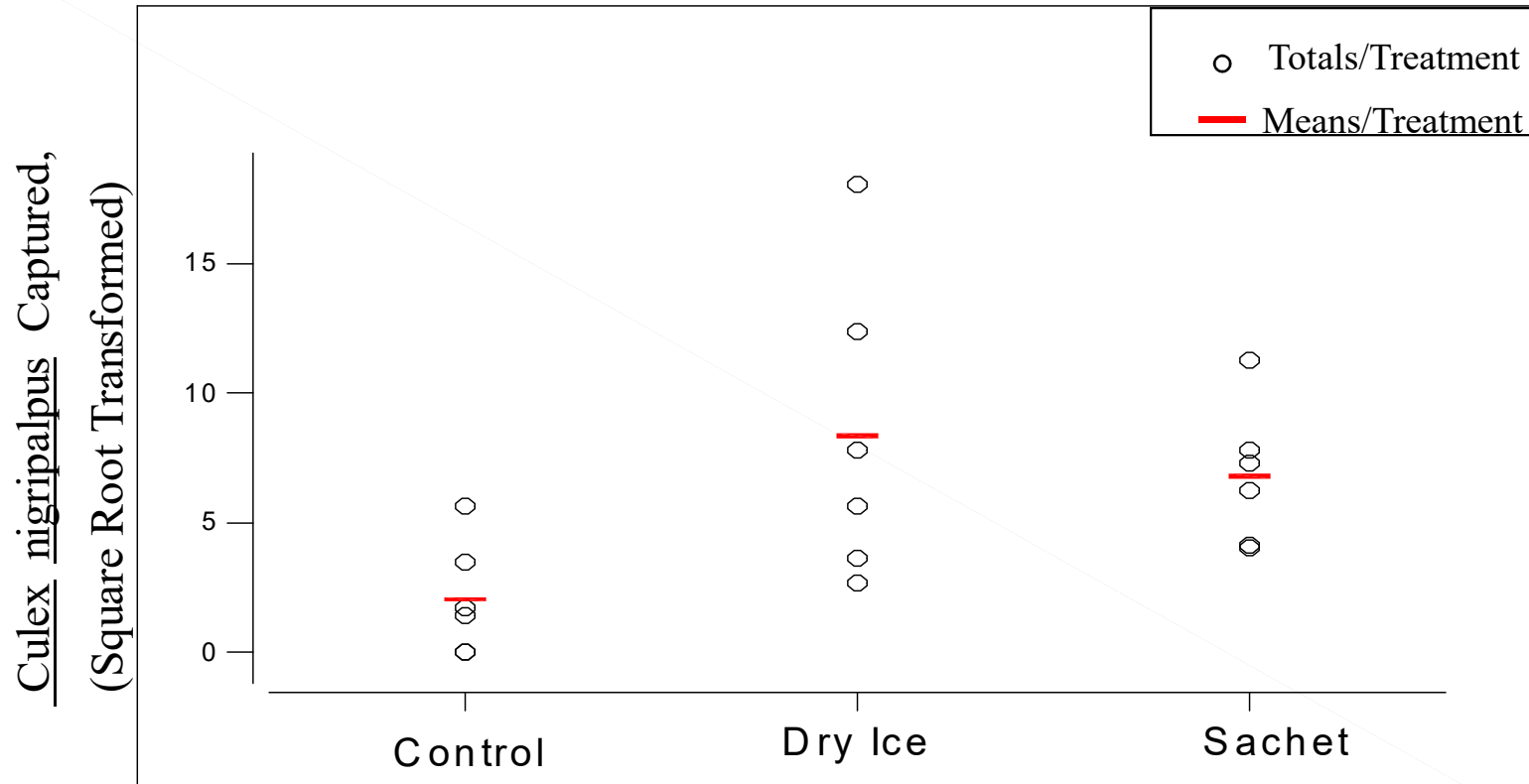
RBD for a Repeated Measurements Experiment with treatments arranged as a

Latin Square for each area; Data -- Square Root Transformed

ANOVA:  $df = 17$ ;  $F(2, 15)$ ;  $P = 0.020$

Control : Dry Ice, Significant ( $\alpha = 0.05$ ) -- Dunnett's Comparisons

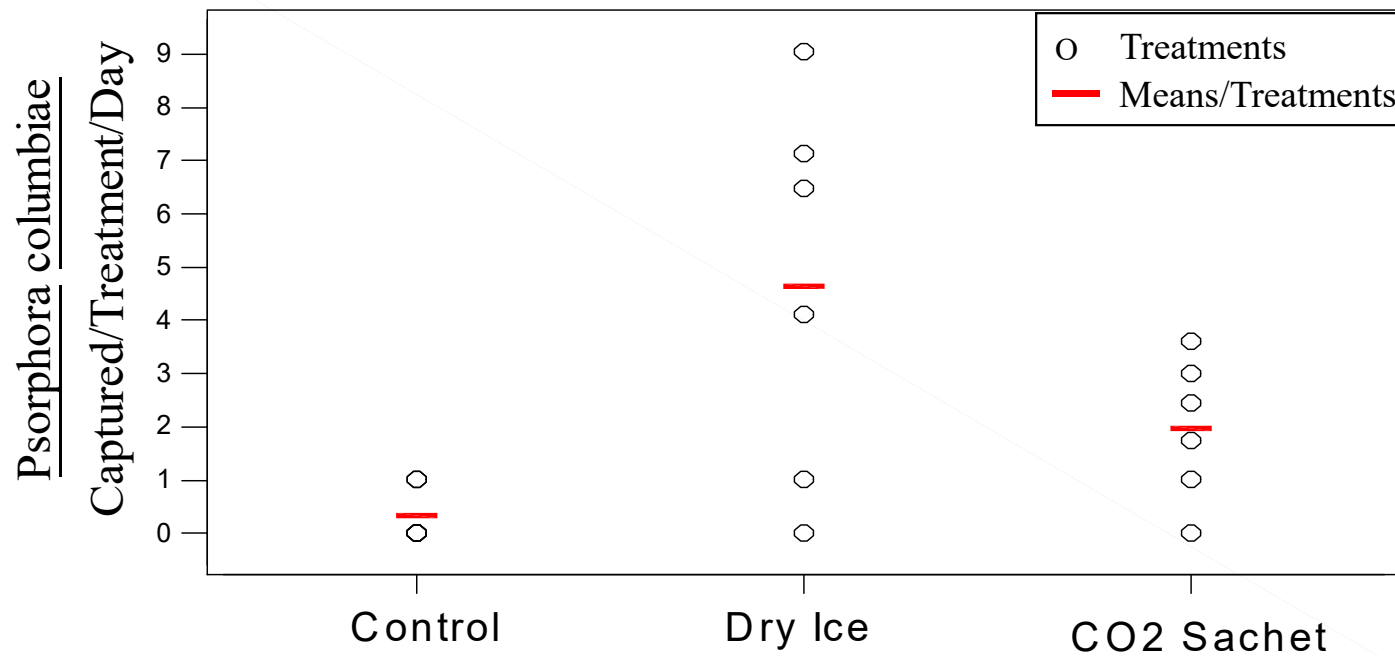
# *Culex nigripalpus* Captured by Different Light trap Treatments, FL



ANOVA:  $df = 2, 17$ ;  $F = 4.17$ ;  $P = 0.035$

Control : Dry Ice -- Significant ( $\alpha = 0.05$ ) by Dunnett's Comparisons

# *Psorophora columbiae* Captured by Light Trap Treatments, FL

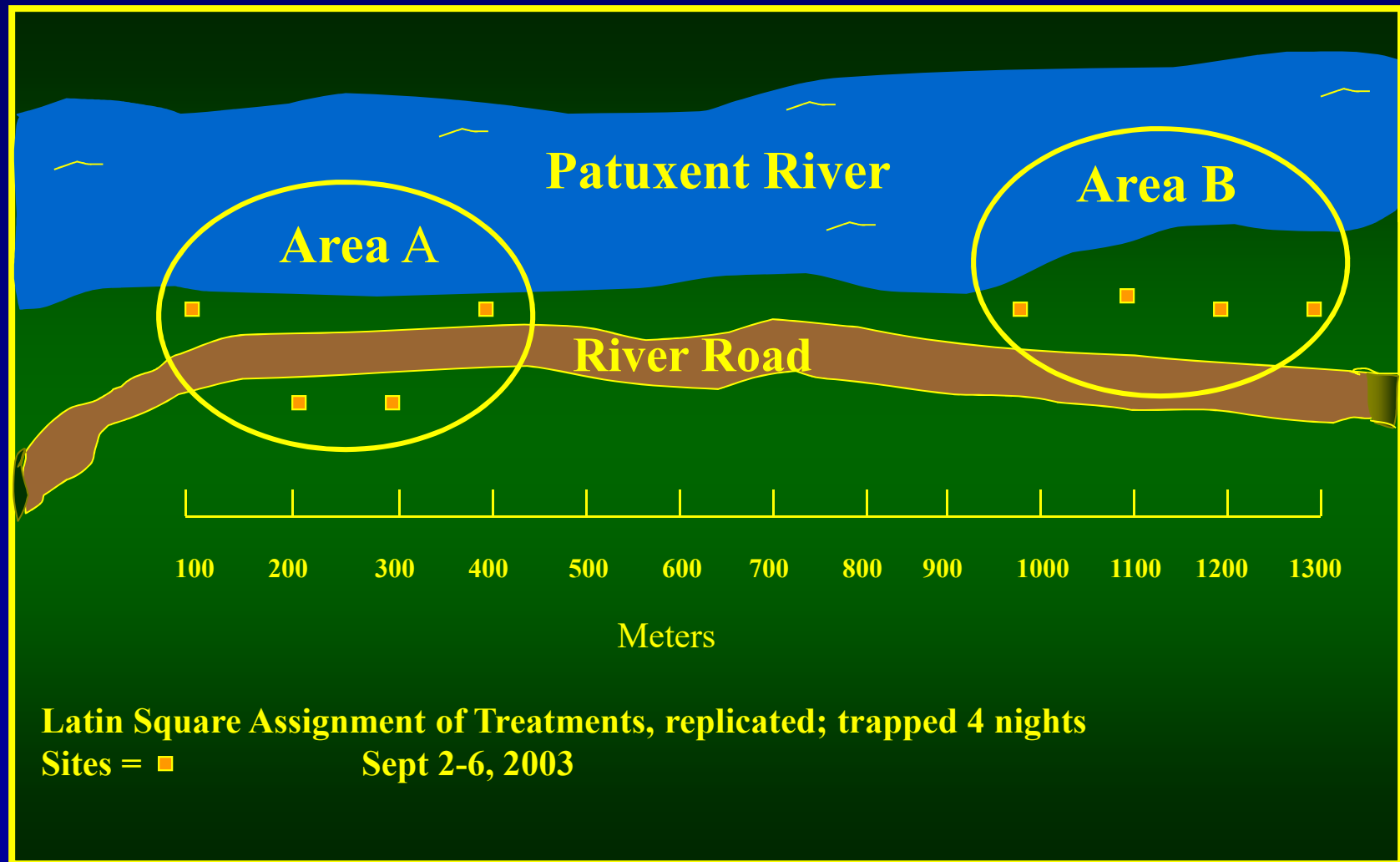


Square Root Transformed

ANOVA:  $df = 2, 17, F = 5.7, P = 0.014$

Dunnett's Comparisons of Control : Dry Ice -- Significant ( $\alpha = 0.05$ )

# Preliminary Field Study, Patuxent Wildlife Research Center, Laurel, MD



# Female Mosquitoes Caught by Different Treatments at Patuxent – Preliminary Data, Area A

<u>Genera</u>	<u>Treatment</u>	<u>N</u>	<u>Mean</u>	<u>Std Dev</u>
<i>Coquaticidia</i>	Control	4	4.14	3.53
	CO2 Sachets	4	3.99	1.76
	Dry Ice	4	7.96	1.49
	Lactic Acid + CO2	4	3.93	1.93
<i>Culex</i>	Control	4	3.14	1.88
	CO2 Sachets	4	6.04	2.71
	DI	4	5.76	1.33
	Lactic Acid + CO2	4	4.96	2.14
<i>Anopheles</i>	Control	4	4.09	4.76
	CO2 Sachets	4	2.86	3.07
	Dry Ice	4	5.38	3.07
	Lactic Acid + CO2	4	2.11	1.93

# Female Mosquitoes Caught (continued)

<u>Genera</u>	<u>Treatment</u>	<u>N</u>	<u>Mean</u>	<u>Std Dev</u>
<i>Uranotaenia</i>				
	Control	4	3.10	4.27
	CO2	4	3.88	3.49
	Dry Ice	4	3.02	3.14
	Lactic Acid + CO2	4	3.35	2.53
<i>Aedes</i>				
	Control	4	2.45	3.69
	CO2 Sachets	4	0.79	1.58
	Dry Ice	4	4.50	2.51
	Lactic Acid + CO2	4	1.47	0.35

# Conclusions

1. *Insectigator* sachets offer an easy, simple, lightweight, inexpensive alternative to dry ice and compressed gas, especially in remote areas
2. The technology can be combined with other attractants
3. The chemicals can be manipulated to skew the production of CO<sub>2</sub> (maximum production 0 - 3 hrs, 8 hrs, etc)
4. *Insectigator* sachets can be used to attract other blood sucking arthropods, in housing or for field surveillance

# Acknowledgements

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