

# INSTANT CO<sub>2</sub>

Daniel L. Kline

USDA, ARS, CMAVE

Gainesville, FL

[dkline@gainesville.usda.ufl.edu](mailto:dkline@gainesville.usda.ufl.edu)

# Introduction

The most effective attractant for most mosquito and biting fly species is carbon dioxide (CO<sub>2</sub>). CO<sub>2</sub> is traditionally supplied to traps from either compressed gas cylinders (which requires regulators) or as dry ice. Both methods of utilizing CO<sub>2</sub> are inconvenient and often unavailable in remote locations.

# Insectigator<sup>TM</sup> (CO<sub>2</sub>) Gas Sachet

Instant CO<sub>2</sub>

# Objectives

- To evaluate the efficacy of Insectigator™ (CO<sub>2</sub>) Gas Sachet under laboratory, large cage and field conditions.
- To determine the diversity of mosquito species attracted.
- To determine the longevity of effectiveness.

Tue  
4eg 2/4

CRYSTAL CLEAR

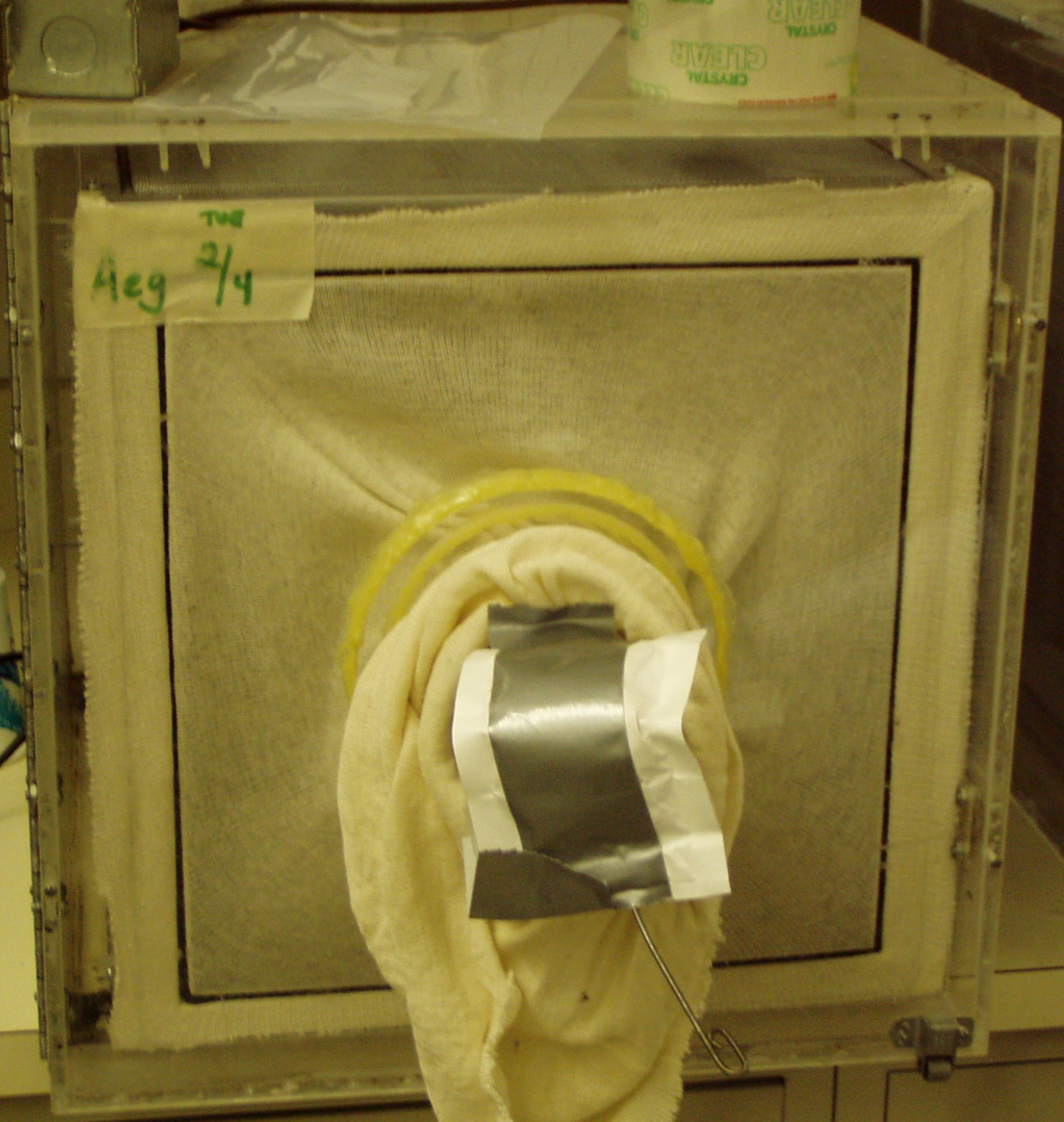
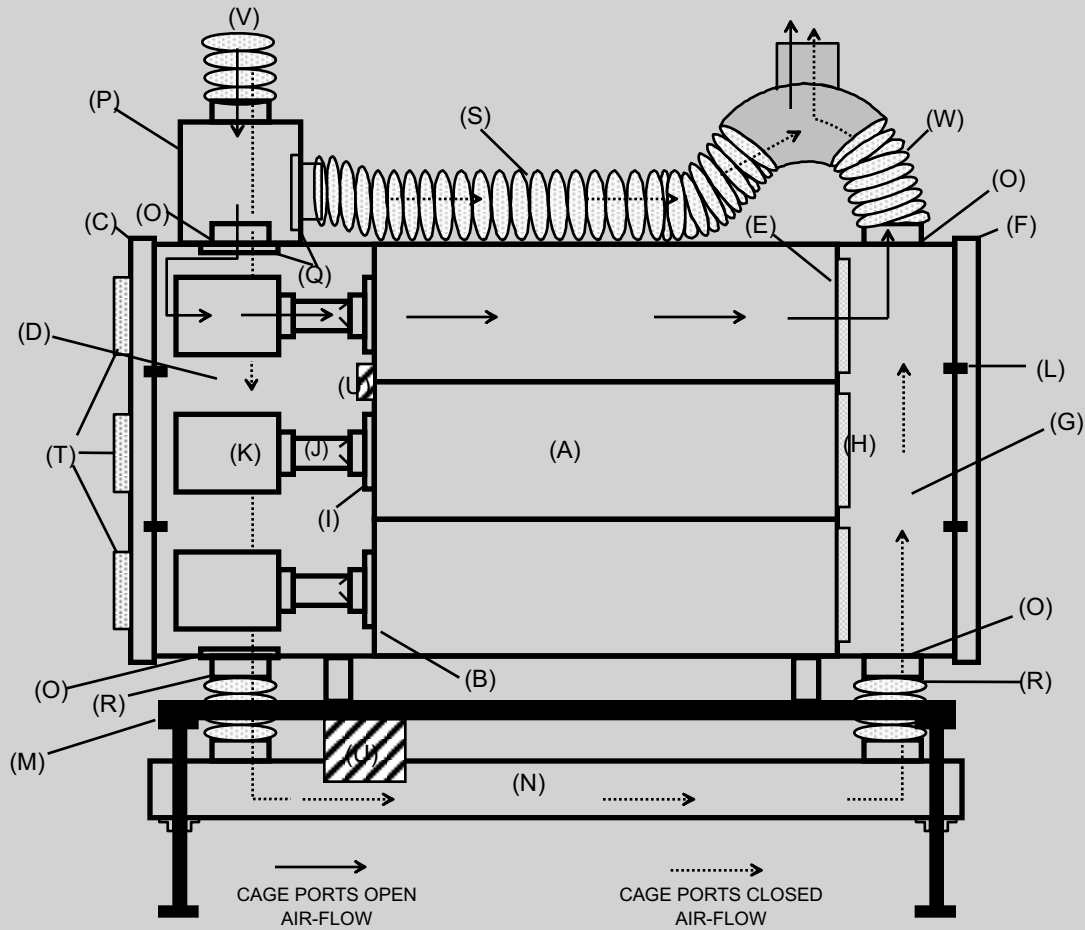
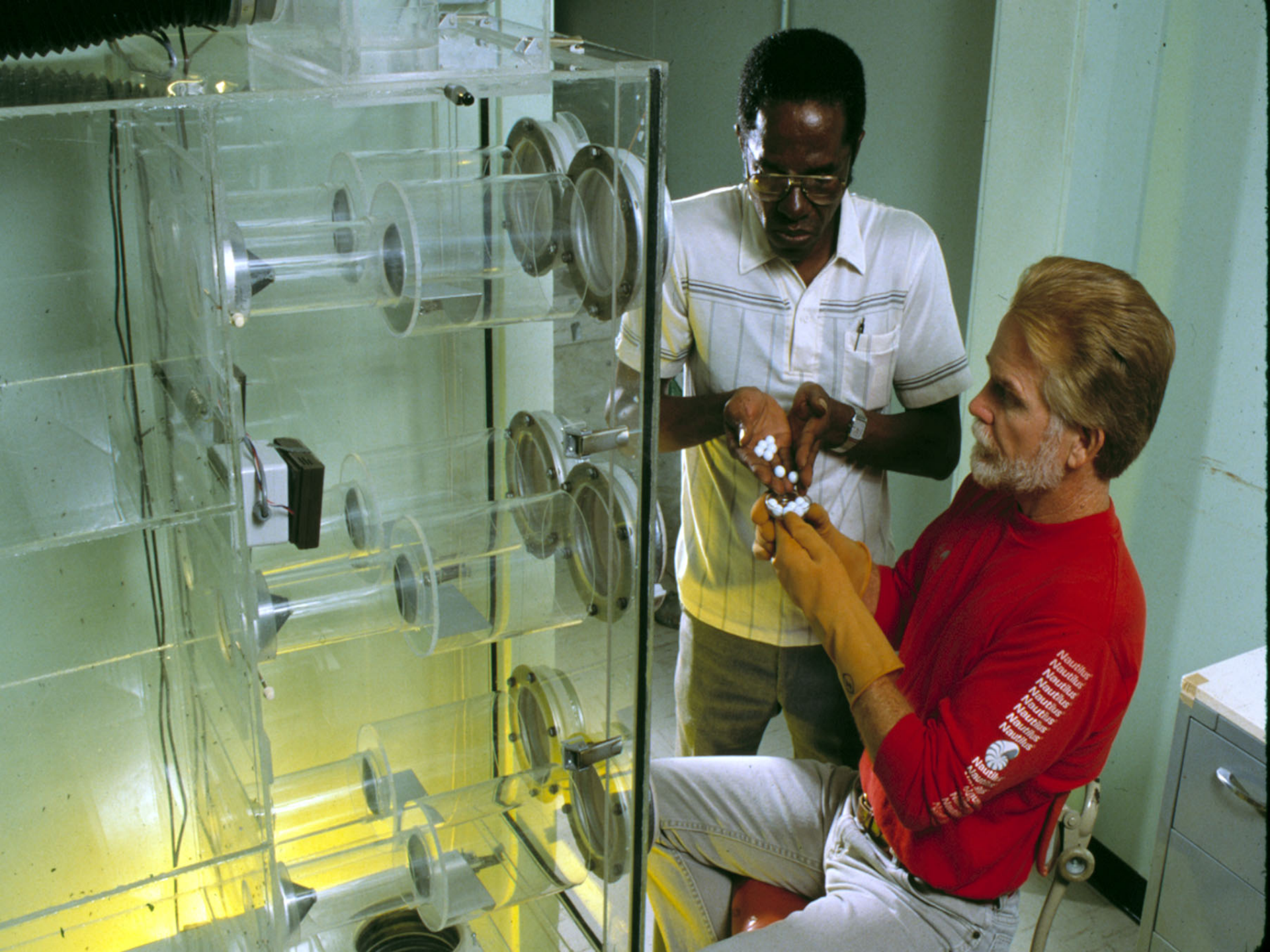


Table 1: Mosquito trapping experiment in small airflow apparatus at USDA Gainesville, FL (Air rate = ca. 107 L / min; Temp and RH, ambient)						
Date, 2003	Expt No.	Sachet (Note 1)	Exposure time, min	No. of Trapped Mosquitoes		
				Female	Male	
<i>Aedes aegypti</i> (yellow fever mosquito)						
2/13	1	M	3	90	1	
2/13	2	H	3	115	2	
2/13	3	L	3	45	2	
2/13	4	C	3	22	2	
2/13	5	H	3	35	0	
2/13	6	M	3	43	0	
2/13	7	C	3	6	0	
2/13	8	L	3	2	2	
2/13	9	M	30	784	12	
2/13	10	H	30 (Note 2)	49	0	
2/13	11	H	30	287	20	
2/13	12	L	30	495	11	
<i>Ochlerotatus taeniorhynchus</i> (black salt marsh mosquito)						
2/13	13	M	3	69	0	
2/13	14	H	3	100	1	
2/14	15	M	30	320	0	
2/14	16	L	3	87	0	
2/14	17	M	3	30	0	
2/14	18	L	30	74	2	
<b>Notes</b>						
<b>1. Sachets contained three chemical components</b>						
<b>Sachet sizes: L ( low ) ; M ( medium ) ; H ( high ) ; C ( control)</b>						
2. In Expt 10, air fan was turned on only for the final 3 minutes of run.						
3. Air rate based on measured 55 ft/min (1676 cm/min) through a 9 cm diam trap porthole.						
4. Fresh cage contained about 6000 mosquitoes, with ca. 50% M and 50% F.						



- A. INSECT-HOLDING TEST CAGE
- B. ANTERIOR PARTITION
- C. FRONT COVER
- D. INTAKE PLENUM
- E. REAR PARTITION
- F. REAR COVER
- G. EXHAUST PLENUM
- H. SCREEN FRAME
- I. DUAL PORT SLIDING DOOR
- J. TRAP ASSEMBLY
- K. SLEEVE ASSEMBLY
- L. PRESSURE LATCHES

- M. BASE
- N. BYPASS PLENUM
- O. PLENUM PORTS
- P. AIR-FLOW DIVERTER BOX
- Q. AIR-FLOW PORT DOOR
- R. AIR-FLOW DUCT
- S. BYPASS DUCT
- T. IRIS DIAPHRAGM OPENING
- U. DATA-LOGGER\RH\TEMP\BP\SENSORS
- V. INTAKE DUCT
- W. EXHAUST DUCT





# Olfactometer Studies

Average % attracted (3 minutes)

Sachet	95.7
CO <sub>2</sub> ---5ml/min	20.7

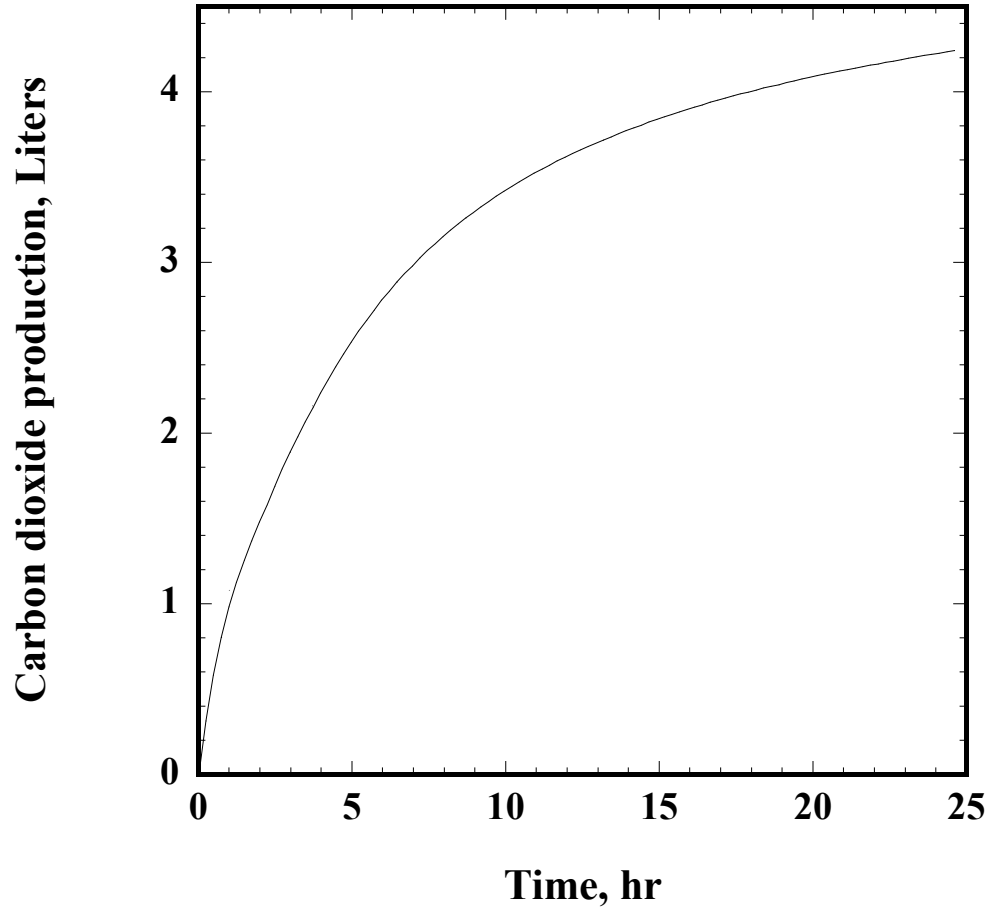
# Attraction of *Aedes aegypti* to Single Compounds and Two-Compound Blends

Base Attractant	Activator	R(%)	Sum(%)	SE(%)
200 g L-Lactic Acid	1 B Cap MeCl <sub>2</sub>	80.1		2.4
200 g L-Lactic Acid	1 B Cap DMDS	78.4		3.4
200 g L-Lactic Acid	1 B Cap Acetone	77.9		2.1
HAND: UB (Average)		67.0		
	1 B Cap MeCl <sub>2</sub>	39.4	59.9	5.8
	1 B Cap Acetone	26.2	46.7	5.0
	1 B Cap DMDS	25.3	45.8	4.0
200 g L-Lactic Acid		20.5		

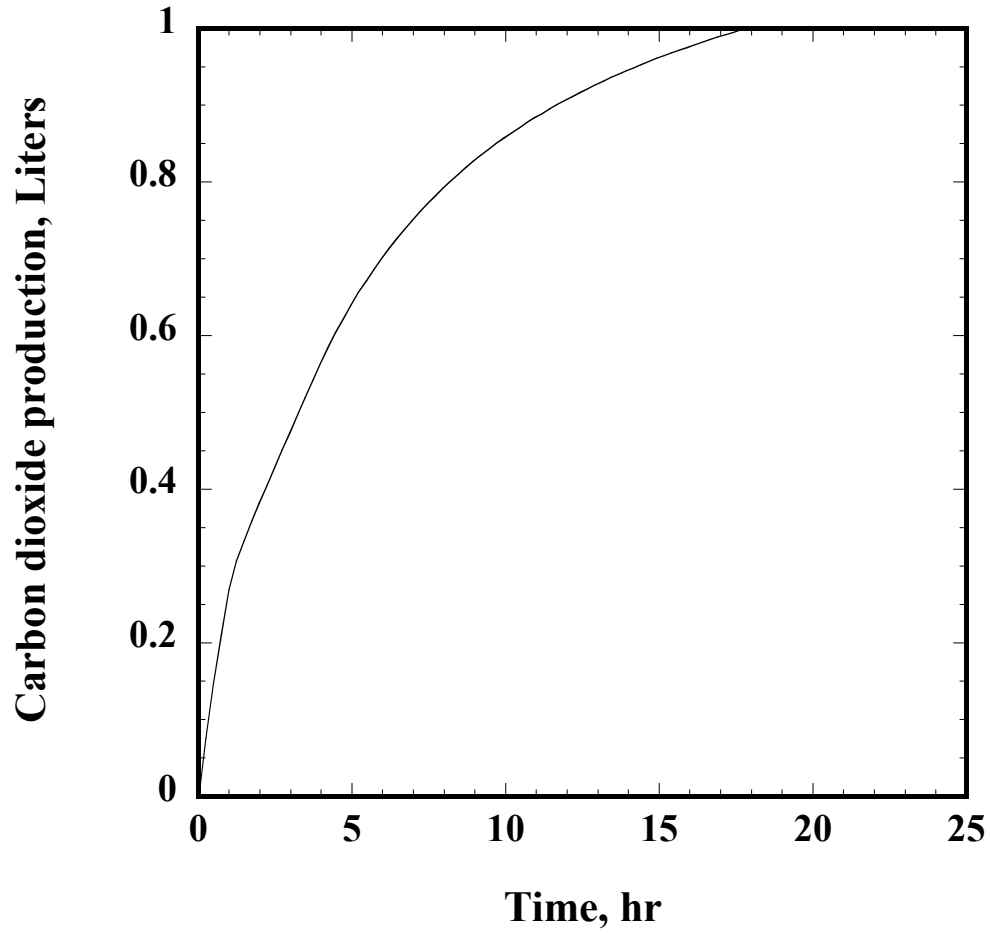
# Olfactometer Sachet Longevity Studies

Time (hr) after activation	Average % attracted (3 mins)
0	95.8
1.5	97.4
4.5	94.1
22	76.8

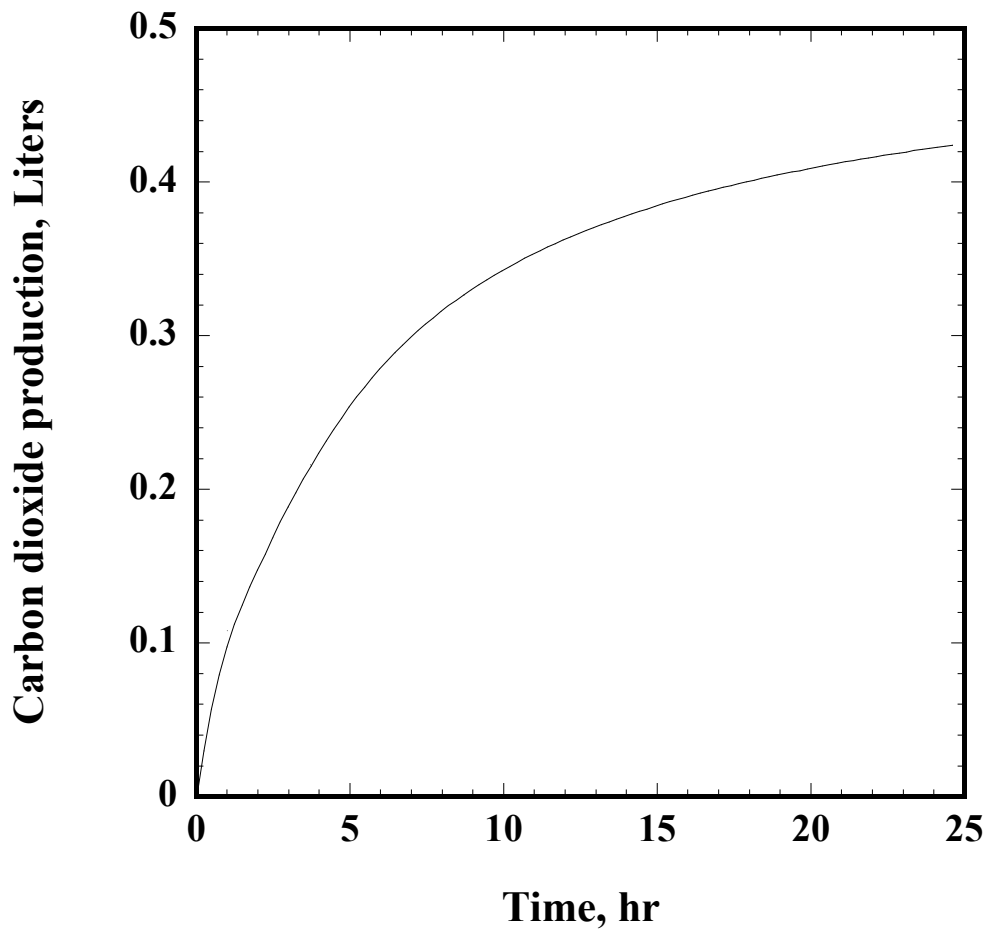
**Experimental Insectagator sachet  
Carbon dioxide release profile  
Size H**



**Experimental Insectagator sachet  
Carbon dioxide release profile  
Size M**



**Experimental Insectagator sachet  
Carbon dioxide release profile  
Size L**





# Large Cage Studies





# Large Cage—Backyard Setting





# Diversity of Mosquitoes Collected

MM-X traps baited with CO <sub>2</sub> sachets		
Species	Octenol	No octenol
Anopheles crucians	11	7
Culex quinquefasciatus	15	12
Cx salinarius	17	13
Culiseta melanura	15	33
Ochlerotatus atlanticus	18	4
Oc canadensis	11	5
Oc infirmatus	78	19
Psorophora ferox	1	1

# Acknowledgments

Joel Tenney, Dr. Bill Ernst and J. Barry Billett of ICA Tri Nova, Corporation for supplying me with the CO<sub>2</sub> sachets. Ken Posey of the USDA, CMAVE laboratory for conducting the olfactometer studies and my technicians Joyce Urban and Aaron Lloyd for assisting in the large cage studies.