UNIVERSITY OF FLORIDA

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Phase II Report on catch rates for 6 trap trial July 30, 2002

TITLE: Evaluation of Mosquito Magnet, Brookstone - Mosquito Eradicator, Lentek – Mosquito Trap with and without musk attractant and a Modified CDC Trap.

OBJECTIVE:

The objective of this proposal is to compare, under scientifically controlled and replicated conditions, the catch from Lentek's new generation trap as augmented by attractants as compared to other traps. Results from this project will provide consumers information needed to adequately assess the usefulness of these systems.

LEADER:

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COOPERATORS:

Lentek
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PROCEDURES:

Procedures and Apparatus supplied by Lentek, 1629 Prime Court, Suite 800 Orlando, FL 32859-3812. Patented semiochemical attractants and Modified CDC Light Traps supplied by the University of Florida, Gainesville FL 32611-0620.

MATERIALS and METHODS:

A field trial was conducted June 26- July 19, near Eureka, FL 2002 to evaluate the effectiveness of Lentek supplied Mosquito Traps in order to compared four trap types. Comparisons were made between (A) Mosquito Magnet 'Liberty', (B) Brookstone - Mosquito Eradicator, (C) Lentek – Mosquito Trap, (D) Lentek – Mosquito Trap augmented with .005g Musk 781/treatment day as an attractant and (E) a University of Florida supplied Modified CDC Trap that included 4, 470 nanometer blue diodes and added tank supplied CO2 @ 250 ML/ min. All traps were run with fine mesh collecting bags installed in order to retain insects as small as Culicoides for evaluation.

Traps were placed at least 20 yards apart without visual view of each other. Traps were randomly placed and locations rotated for each replication. Traps were run at each site replication for 3 trap nights. They were then repositioned for a total of 6 replications. A total of 5 traps, 6 replications with 3 trap nights per replication for a total of 90-trap day samples were compiled. Insects were removed from the traps after each 24-hour period and placed in a freezer for storage until specimens could be identified. Most insects of Medical importance were identified to the generic level and occasionally the species level. Condition of the insect specimens after passing through the collection fans often limited further identification. Trap night collections were combined for analysis of each site replication for each trap type.

RESULTS:

Data tabulated by trap, date, location, species, and number is presented in Tables 1-4. Table 1- lists the raw data used analysis. Table 2- lists the converted data used for statistical analysis. Table 3 – presents a specimen list for each trap type. Table 4 - is the listing of statistical analysis for the normalized data for all trap comparisons.

A graphic presentation of the total number of specific insects collected per trap type and the statistical relationship is presented in Figures 1-4. Figure 1- presents the total insect count from each trap tested. Figure 2- presents the total mosquito of all species counted from each trap tested. Figure 3- presents the total Ceratopogonidae (Culicoides, no-see-ums) count from each trap tested. Figure 4- presents the total Tabanids (Horse and Deer Flies) count from each trap tested. Analysis of variance was conducted using t-Test: Two –Sample Assuming Unequal Variances for data normalized data (sq route of n+1). Significant differences between trap types for insect type are given in the statistical tables (Table 1) and also placed on each of the presented Figures 1-4.

RESULTS AND DISCUSSION:

Total of all Insect Types Trapped Figure 1: Trap types A (Mosquito Magnet), Trap C (Lentek Mosquito Trap), Trap D (Lentek Mosquito Trap with Musk 471 attractant) and the Modified CDC light trap E (University of Florida Modified CDC Trap), all were significantly better than Trap B (Brookstone Mosquito Eradicator) in collection of all insects attracted to the trap as presented in Figure 1. Trap E (Modified CDC Trap) was significantly better than Traps A (Mosquito Magnet), B (Brookstone Mosquito Eradicator), and D (Lentek Mosquito Trap with Musk 471 attractant) but not C (Lentek Mosquito Trap) in collecting total insects.

Total Mosquitoes Trapped Figure 2: Trap types A (Mosquito Magnet), had significantly better catch rates than Trap B (Brookstone Mosquito Eradicator) and D (Lentek Mosquito Trap with Musk 471 attractant). Trap C (Lentek Mosquito Trap) and E (Modified CDC Trap) were significantly better than B (Brookstone Mosquito Eradicator). Trap E was significantly better than both B (Brookstone Mosquito Eradicator) and D (Lentek Mosquito Trap with Musk 471 attractant) in collection of all mosquito species coming to the traps.

Total of all Ceratopogonidae Trapped Figure 3: Traps C (Lentek Mosquito Trap), A (Mosquito Magnet) and D (Lentek Mosquito Trap with Musk 471 attractant) were significantly better than Trap B (Brookstone Mosquito Eradicator) in collection of Ceratopogonidae (sand flies or no-see-ums).

Total of Tabanids Trapped Figure 4: Trap types A (Mosquito Magnet), Trap C (Lentek Mosquito Trap), Trap D (Lentek Mosquito Trap with Musk 471 attractant) and Trap E, the Modified CDC light trap all were significantly better than Trap B (Brookstone Mosquito Eradicator) in collection of horse flies and deer flies. Trap D (Lentek Mosquito Trap with Musk 471 attractant) was significantly better than Trap E the Modified CDC Trap.

Traps A (Mosquito Magnet) and B (Brookstone Mosquito Eradicator) had octenol cartridges as added attractants. These were replaced about mid trial. Trap A (Mosquito Magnet) is designed as a counter flow CO2 trap with a side door for collection bag removal. This door and latch failed to properly seal the chamber on numerous 24-hour catch periods and undoubtedly reduced the expected catch of insects. This is a major fault with the trap, which catches high numbers of Medically important insects when working properly. The Traps A (Mosquito Magnet), Trap C (Lentek Mosquito Trap), Trap D (Lentek Mosquito Trap with Musk 471 attractant) and Trap E the Modified CDC Trap were effective in catching *Diachlorus ferrugatus* the Tabanid commonly known as the Yellow Fly. A significant increase in Yellow fly capture rates was seen for The Lentek Mosquito Trap when Musk 471 was added as compared to the catch rates for the Modified CDC Trap (Figure 4). Both the Trap C (Lentek Mosquito Trap), and Trap D (Lentek Mosquito Trap with Musk 471 attractant) gave non-significant increases in Culicoides catch rates (Figure 3). The Traps A (Mosquito Magnet), Trap C (Lentek Mosquito Trap), Trap D (Lentek Mosquito Trap with Musk 471 attractant) and Trap E the Modified CDC Trap were significantly more effective in catching Culicoides than Trap B (Brookstone Mosquito Eradicator).

PROPRIETARY INFORMATION:

Proprietary information includes resultant insect counts, and activity as reported Lentek

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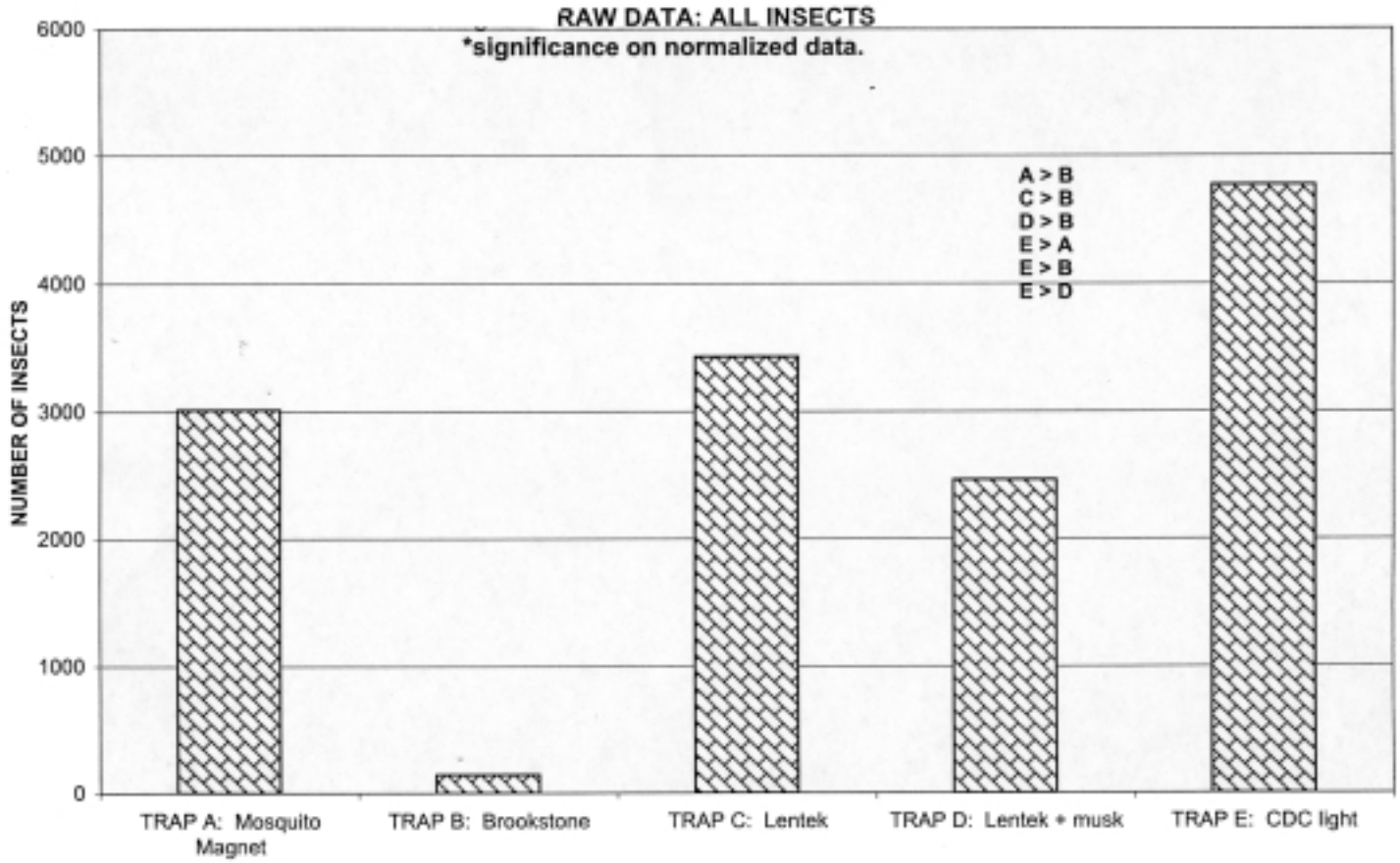
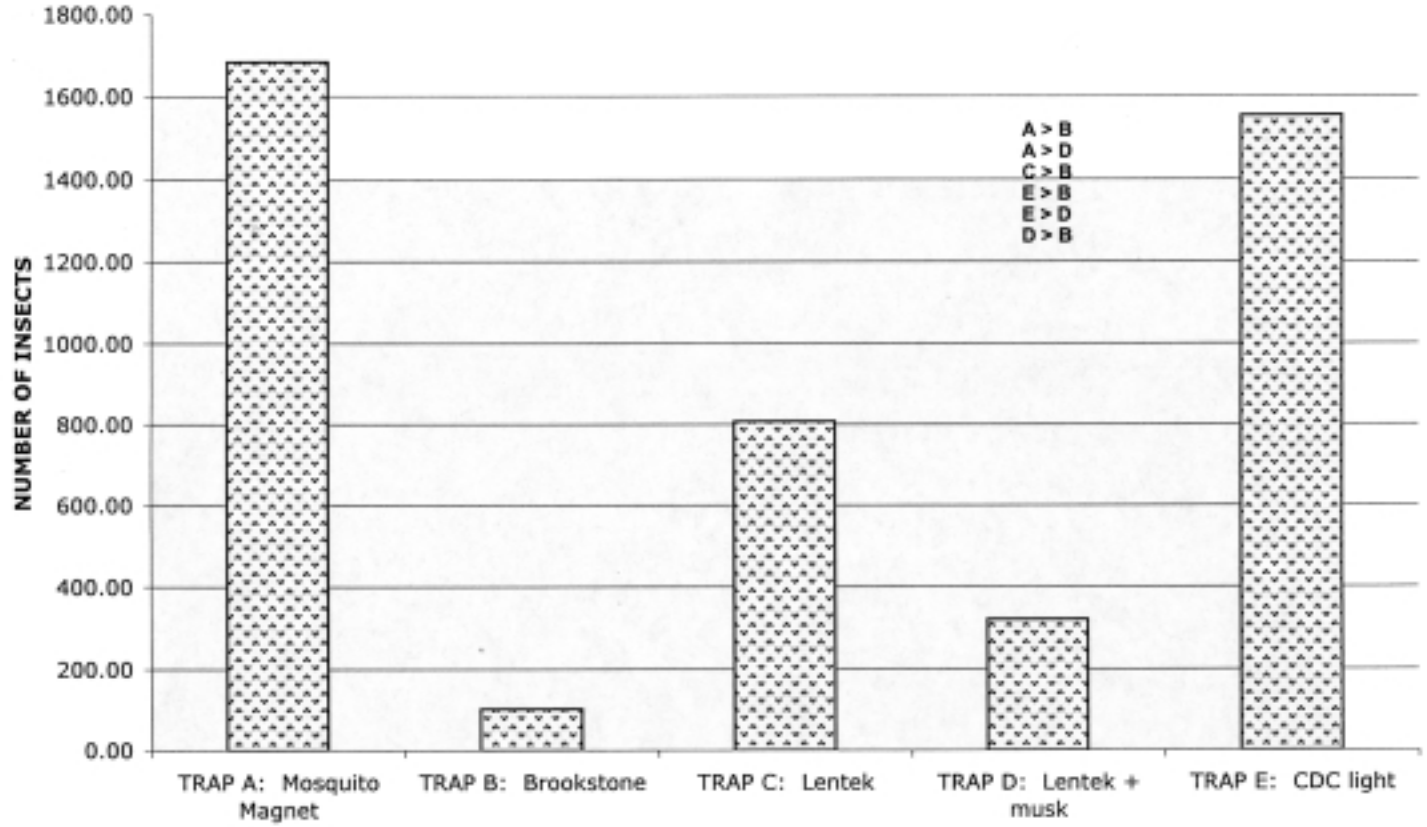
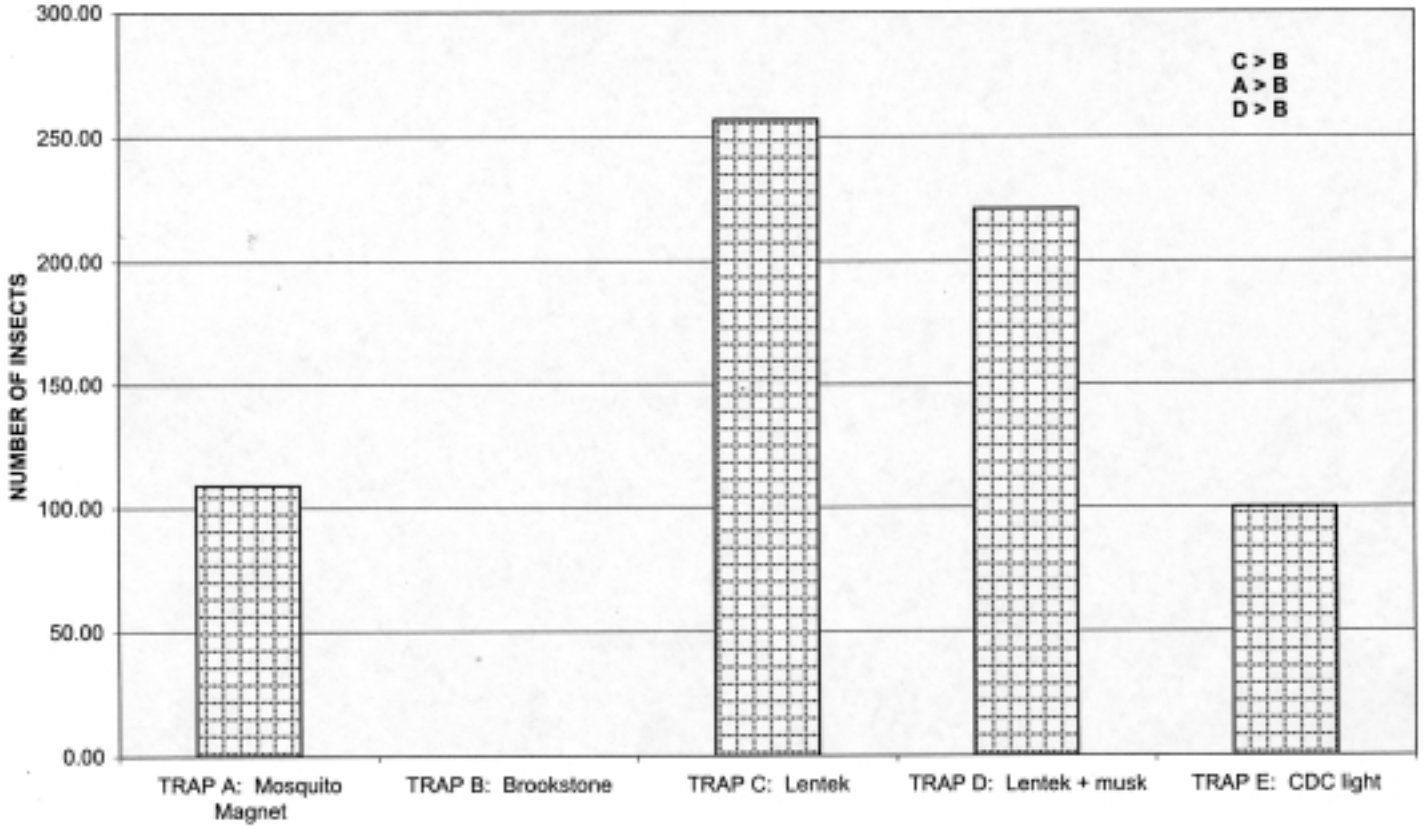


Figure 2. RAW DATA: CULICIDAE, ALL MOSQUITOES
***significance on normalized data.**



RAW DATA: CERATOPOGONIDAE, sand flies- No-see-ums
***significance on normalized data.**



RAW DATA: TABANIDS, Horse and Deer Flies
***significance on normalized data.**

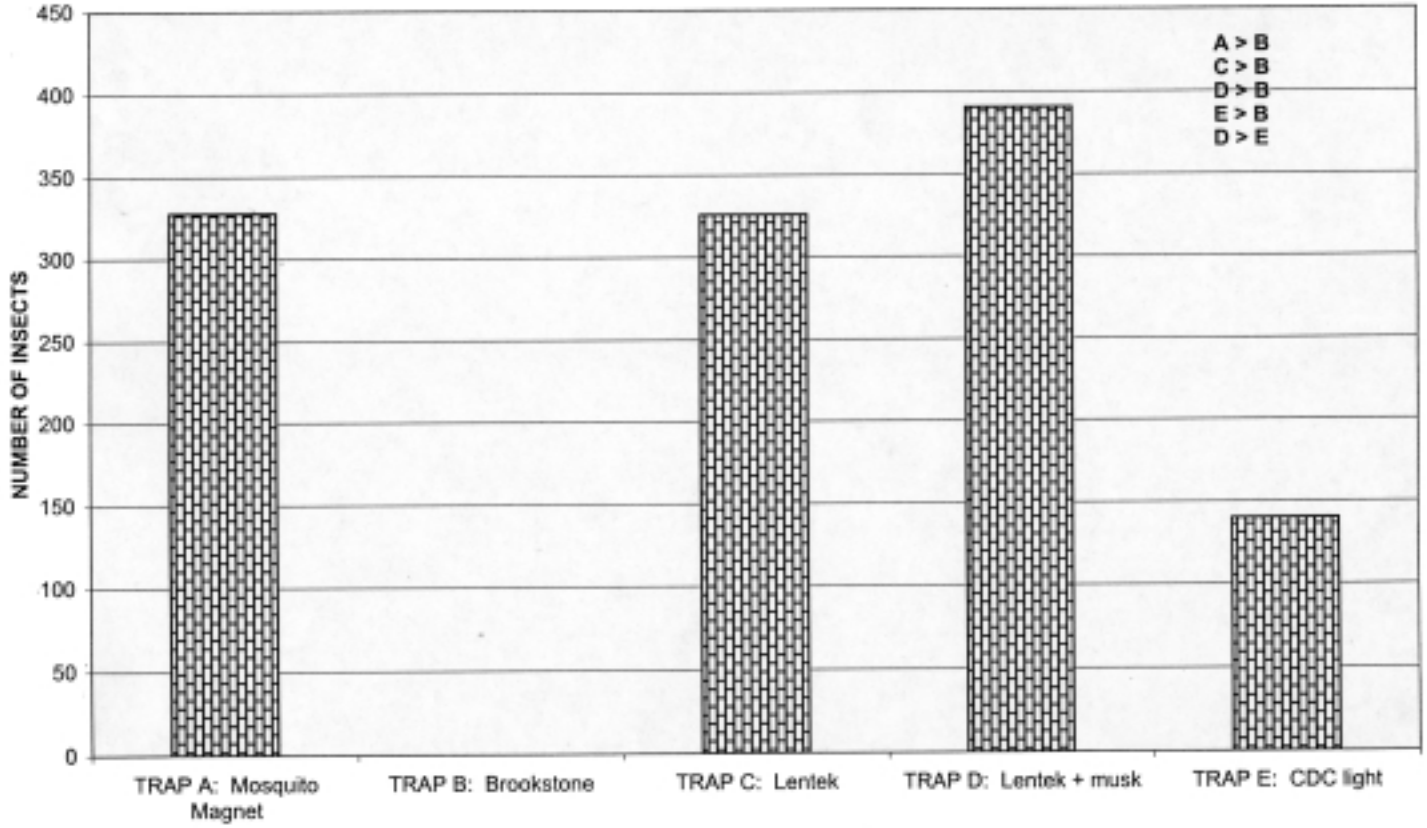


Table 1. Raw Data for Analysis

ALL INSECTS					
	TRAP A	**TRAP B**	**TRAP C**	**TRAP D**	**TRAP E**
REP 1	137.00	0.00	333.00	160.00	670.00
REP 2	170.00	0.00	197.00	273.00	817.00
REP 3	663.00	0.00	446.00	175.00	749.00
REP 4	788.00	0.00	646.00	501.00	1173.00
REP 5	665.00	145.00	790.00	512.00	779.00
REP 6	592.00	0.00	1020.00	846.00	584.00
TOTAL	**3015.00**	**145.00**	**3432.00**	**2467.00**	**4772.00**
MEAN	**502.50**	**24.17**	**572.00**	**411.17**	**795.33**

CULICIDAE					
	TRAP A	**TRAP B**	**TRAP C**	**TRAP D**	**TRAP E**
REP 1	19.00	0.00	22.00	14.00	71.00
REP 2	25.00	0.00	8.00	17.00	123.00
REP 3	402.00	0.00	115.00	48.00	368.00
REP 4	436.00	0.00	91.00	47.00	281.00
REP 5	522.00	102.00	353.00	61.00	311.00
REP 6	280.00	0.00	219.00	134.00	399.00
TOTAL	**1684.00**	**102.00**	**808.00**	**321.00**	**1553.00**
MEAN	**280.67**	**17.00**	**134.67**	**53.50**	**258.83**

CERATOPOGONIDAE					
	TRAP A	**TRAP B**	**TRAP C**	**TRAP D**	**TRAP E**
REP 1	0.00	0.00	0.00	0.00	25.00
REP 2	7.00	0.00	1.00	9.00	64.00
REP 3	11.00	0.00	22.00	3.00	0.00
REP 4	20.00	0.00	73.00	48.00	11.00
REP 5	1.00	0.00	33.00	21.00	0.00
REP 6	70.00	0.00	128.00	140.00	0.00
TOTAL	**109.00**	**0.00**	**257.00**	**221.00**	**100.00**
MEAN	**18.17**	**0.00**	**42.83**	**36.83**	**16.67**

TABANIDS					
	TRAP A	**TRAP B**	**TRAP C**	**TRAP D**	**TRAP E**
REP 1	3.00	0.00	14.00	45.00	22.00
REP 2	18.00	0.00	28.00	38.00	21.00
REP 3	155.00	0.00	68.00	56.00	52.00
REP 4	112.00	0.00	106.00	131.00	42.00
REP 5	40.00	0.00	104.00	116.00	3.00
REP 6	0.00	0.00	6.00	5.00	0.00
TOTAL	**328.00**	**0.00**	**326.00**	**391.00**	**140.00**
MEAN	**54.67**	**0.00**	**54.33**	**65.17**	**23.33**

Table 2. Converted Data for Analysis

ALL INSECTS					
	TRAP A	**TRAP B**	**TRAP C**	**TRAP D**	**TRAP E**
REP 1	12.70	1.00	19.25	13.65	26.88
REP 2	14.04	1.00	15.04	17.52	29.58
REP 3	26.75	1.00	22.12	14.23	28.37
REP 4	29.07	1.00	26.42	23.38	35.25
REP 5	26.79	13.04	29.11	23.63	28.91
REP 6	25.33	1.00	32.94	30.09	25.17
TOTAL	**134.68**	**18.04**	**144.86**	**122.50**	**174.16**
MEAN	**22.45**	**3.01**	**24.14**	**20.42**	**29.03**

CULICIDAE					
	TRAP A	**TRAP B**	**TRAP C**	**TRAP D**	**TRAP E**
REP 1	5.36	1.00	5.69	4.74	9.43
REP 2	6.00	1.00	3.83	5.12	12.09
REP 3	21.05	1.00	11.72	7.93	20.18
REP 4	21.88	1.00	10.54	7.86	17.76
REP 5	23.85	11.10	19.79	8.81	18.64
REP 6	17.73	1.00	15.80	12.58	20.97
TOTAL	**95.87**	**16.10**	**67.37**	**47.03**	**99.07**
MEAN	**15.98**	**2.68**	**11.23**	**7.84**	**16.51**

CERATOPOGONIDAE					
	TRAP A	**TRAP B**	**TRAP C**	**TRAP D**	**TRAP E**
REP 1	1.00	1.00	1.00	1.00	6.00
REP 2	3.65	1.00	2.00	4.00	9.00
REP 3	4.32	1.00	5.69	2.73	1.00
REP 4	5.47	1.00	9.54	7.93	4.32
REP 5	2.00	1.00	6.74	5.58	1.00
REP 6	9.37	1.00	12.31	12.83	1.00
TOTAL	**25.80**	**6.00**	**37.29**	**34.07**	**22.32**
MEAN	**4.30**	**1.00**	**6.22**	**5.68**	**3.72**

TABANIDS					
	TRAP A	**TRAP B**	**TRAP C**	**TRAP D**	**TRAP E**
REP 1	2.73	1.00	4.74	7.71	5.69
REP 2	5.24	1.00	6.29	7.16	5.58
REP 3	13.45	1.00	9.25	8.48	8.21
REP 4	11.58	1.00	11.30	12.45	7.48
REP 5	7.32	1.00	11.20	11.77	2.73
REP 6	1.00	1.00	3.45	3.24	1.00
TOTAL	**41.33**	**6.00**	**46.22**	**50.81**	**30.70**
MEAN	**6.89**	**1.00**	**7.70**	**8.47**	**5.12**

Table 3. Specimen List for Traps

A	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	16	17	18
Specimens					NW								NW					MS
A. albopictus										7	3	3			2	3	2	
Aedes	1					10		13	1					2	3	1	5	
Amblyomma											1							
Anopheles														4			2	
Ceratopogonidae						7	2	9		2	5	13		1		62	8	
Chaoboridae	7					64	8	73	4	61	25	19		20	36	115	105	
Chironomidae	85					21		2		13	4						6	
Chloropidae																	1	
Coleoptera											4			1		5		
Culex	8					1	7	10	3	12				2	8	5	11	
D. ferrugatus	3					18	19	108	27	59	20	33		18	22			
Diptera	3																	
Hemiptera	2														1			
Homoptera											1			2				
Hymenoptera	3					7		4	1	2	2				2		1	
Lepidoptera	2																	
Mansonia	10					3	2	4		7				1			4	
Mycetophiliidae						1												
Ocleratatus						11	65	220	57	215	80	100		372	121		239	
Phoridae						2	1			1		6		2	2		2	
Psorophora							3	15	2	2	2	5			7		8	
Psychodidae	7					11		6		8	6				10		3	
Sepsidae											1							
Simuliidae						10	2	13	1	19	40	13		12	19		12	
Strepsiptera						2									2			
Tabanus sp.								1										
Tipulidae	6					1					2							
Trichoptera						1				2								

B	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	16	17	18
Specimens	0	0	0	NW	0	0	0	0	0	0	0	NW				0	0	0
Chaoboridae													1					
Coleoptera													1					
Culex													3					
Hymenoptera													8	20	11			
Mansonia													1					
Ocleratatus													67	24	5			
Phoridae														1	1			
Psorophora													1	1				
Sepsidae													1					
Strepsiptera														1				

C	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	16	17	18
Specimens						0	MS											
A. albopictus	1								1	2			1			3		
Aedes	1									1		1				1		
Anopheles														1		1	4	
Ceratopogonidae					1			4	18	3	50	20	15	9	9	62	15	51
Chaoboridae	4	53	89	52	37			96	45	69	150	24	36	38	57	115	65	34
Chironomidae	5	36	11	20	1					10	4				1		1	
Coleoptera		7						5				2	1		3	5	8	
Culex	1	1	11	4				1	2				3	10	5	5		
D. ferrugatus	11	2	1	17	11			56	12	53	25	28	14	20	70	3	1	2
Dictyoptera										1								
Dolochopodidae																	1	
Drosophilidae	1			1									1					
Hemiptera								2										
Homoptera	1				1			1							1		2	
Hymenoptera	4	3	6	2	1			6	8	10	16	3	3		3	9	10	13
Lepidoptera	3	3	10	3	2			3				2	6	3	2	3	1	
Mansonia	1			1									3				4	
Mycetophiliidae					2			1					1					
Ocleratatus	4	1	1	2	1			65	45	19	24	42	125	159	46	102	77	12
Orthoptera									1		1							
Phoridae		5	2	1	3			11	1	6	5	4	5	4	12	13	17	6
Piophiliidae																	1	
Psorophora								1			1	1				5	5	
Psychodidae	22	17	7	21	9			18	26	17	21	12	10	41	49	215	97	28
Sepsidae								1					3	3	1			
Simuliidae					1			1		1					1			
Strepsiptera		1	5	2	1			4	5	2	7	2	3	2	1	8	12	2
Tachinidae								1							1			
Tephritidae		1													2	1		
Tipulidae								1										
Trichoptera			1					3	1	1	3	3	5	1				

LENTÉK

D	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	16	17	18
Specimens			A/D	A/D				A/D						A/D				
A. albopictus	3																	
Aedes	1		?p		1	10				4		1						
Asilidae													1					
Ceratopogonidae					2	7			3	5	38	5	6		15	3	50	87
Chaoboridae	2	7	16	30	63	69	5		9	50	94	4	39		35	42	123	38
Chironomidae	1	5	1		1	1	2			12	5	3					5	3
Chloropidae																	1	
Coleoptera	1	1											2			2	2	
Culex	5		?p	?p	1		2						2				2	
D. ferrugatus	32	12	1	24	6	8	29		27	72	38	21	24	42	50	2	1	2
Diptera	1																	
Dolochopodidae																	1	
Drosophilidae												1						
Embioptera	1																	
Homoptera												1	2				2	
Hymenoptera	2	25	10	12	2	5		35	10	31	4	4	7	40	31	20	12	
Lepidoptera		4	1		1	2		1		1	5	2					2	
Mansonia							1						1				1	
Mycetophiliidae						1				2							1	
Ocleratatus	2	3			1	4	38	1	3	7	16	18	47		11	20	87	21
Phoridae		3				3				4	4		6		6	2	7	3
Psorophora							2	1				1				2	1	
Psychodidae	10		6		6	5			2	17	15	8	27		115	17	225	34
Sepsidae						4		1	1			1	1				1	
Simuliidae											1							
Strepsiptera			2	1	2	1					1	5	2			2	15	2
Tachinidae	1	1																
Trichoptera							1		1								4	1

CDC

E	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	16	17	18
Specimens																		
Aedes	6	9	1	11	3	18		5	9	13	50	8	138	78	10	207	33	17
Anopheles				1		19	14	26	17	22	15	3		9	1	7		2
Ceratopogonidae			25	31	33						11							
Chaoboridae				6		4						3	1	1	1			
Chironomidae	7	50	30	42	43	41			46	47	132			1		14		
Coleoptera	3	1	12		3				4		2				3			
Coquillettidia								1		4								
Culex	19	13	1		10	36	50	178	41	53	31	43	23	33	3	77	17	3
D. ferrugatus	5	17		3	2	16	28	12	12	16	4	22	3					
Dixidae	116	115	102	67	83	202	174		58	105	288	120	107	173	167	102	16	14
Dolochopodidae											7							
Homoptera			8															
Hymenoptera			2						3									
Lepidoptera	5		25	3	13	12	1	3		7		13	8					
Ocleratatus	8	14		13	10			2	18	17		13	9			16	3	
Orthoptera			1															
Phoridae									10	4	5							
Psorophora				2			3	3			3	6	7			14	3	
Psychodidae	9	22	33	28	27	27			21	73	20	7				23	4	9
Sepsidae	3	7									1							
Simuliidae								2			3				3		2	
Tephritidae				8														
Tipulidae			1					3	4	2						1		
Uranotaenia								1										

Table 4. Statistics

ALL INSECTS

t-Test: Two-Sample Assuming Unequal Variances

	TRAP A	*TRAP B*	*TRAP A*	*TRAP C*	*TRAP A*	*TRAP D*	*TRAP A*	*TRAP E*
Mean	22.4470	3.0207	22.4470	24.1439	22.4470	20.4162	22.4470	29.0269
Variance	51.0325	24.5000	51.0325	43.6302	51.0325	41.0142	51.0325	11.7939
Observations	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Hypothesized Mean Differ	0.0000		0.0000		0.0000		0.0000	
df	9.0000		10.0000		10.0000		7.0000	
t Stat	5.4752		-0.4272		0.5185		-2.0334	
P(T<=t) one-tail	**0.0002**		**0.3391**		**0.3077**		**0.0408**	
t Critical one-tail	1.8331		1.8125		1.8125		1.8946	
P(T<=t) two-tail	0.0004		0.6783		0.6154		0.0815	
t Critical two-tail	2.2622		2.2281		2.2281		2.3646	

t-Test: Two-Sample Assuming Unequal Variances

	TRAP B	*TRAP C*	*TRAP B*	*TRAP D*	*TRAP B*	*TRAP E*	*TRAP C*	*TRAP D*
Mean	3.0207	24.1439	3.0207	20.4162	3.0069	29.0269	24.1439	20.4162
Variance	24.5000	43.6302	24.5000	41.0142	24.1667	11.7939	43.6302	41.0142
Observations	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Hypothesized Mean Differ	0.0000		0.0000		0.0000		0.0000	
df	9.0000		9.0000		9.0000		10.0000	
t Stat	-6.2685		-5.2643		-10.6284		0.9925	
P(T<=t) one-tail	**0.0001**		**0.0003**		**0.0000**		**0.1722**	
t Critical one-tail	1.8331		1.8331		1.8331		1.8125	
P(T<=t) two-tail	0.0001		0.0005		0.0000		0.3444	
t Critical two-tail	2.2622		2.2622		2.2622		2.2281	

t-Test: Two-Sample Assuming Unequal Variances

	TRAP C	*TRAP E*	*TRAP D*	*TRAP E*
Mean	24.1439	29.0269	20.4162	29.0269
Variance	43.6302	11.7939	41.0142	11.7939
Observations	6.0000	6.0000	6.0000	6.0000
Hypothesized Mean Differ	0.0000		0.0000	
df	8.0000		8.0000	
t Stat	-1.6066		-2.9024	
P(T<=t) one-tail	**0.0734**		**0.0099**	
t Critical one-tail	1.8595		1.8595	
P(T<=t) two-tail	0.1468		0.0198	
t Critical two-tail	2.3060		2.3060	

WITH a </= .001

TRAP A IS SIGNIFICANTLY DIFFERENT THAN B, P = **0.0002**

TRAP C IS SIGNIFICANTLY DIFFERENT THAN B, P = **0.0001**

TRAP D IS SIGNIFICANTLY DIFFERENT THAN B, P = **0.0003**

TRAP E IS SIGNIFICANTLY DIFFERENT THAN A, P = **0.0408**

TRAP E IS SIGNIFICANTLY DIFFERENT THAN B, P = **0.0000**

TRAP E IS SIGNIFICANTLY DIFFERENT THAN D, P = **0.0099**

CULICIDAE

t-Test: Two-Sample Assuming Unequal Variances

	TRAP A	*TRAP B*	*TRAP A*	*TRAP C*	*TRAP A*	*TRAP D*	*TRAP A*	*TRAP E*
Mean	15.9783	2.6833	15.9783	11.2282	15.9783	7.8391	15.9783	16.5122
Variance	67.5796	17.0000	67.5796	36.0616	67.5796	8.0718	67.5796	21.8457
Observations	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Hypothesized Mean Differ	0.0000		0.0000		0.0000		0.0000	
df	7.0000		9.0000		6.0000		8.0000	
t Stat	3.5411		1.1429		2.2922		-0.1383	
P(T<=t) one-tail	**0.0047**		**0.1413**		**0.0309**		**0.4467**	
t Critical one-tail	1.8946		1.8331		1.9432		1.8595	
P(T<=t) two-tail	0.0095		0.2826		0.0618		0.8934	
t Critical two-tail	2.3646		2.2622		2.4469		2.3060	

t-Test: Two-Sample Assuming Unequal Variances

	TRAP B	*TRAP C*	*TRAP B*	*TRAP D*	*TRAP B*	*TRAP E*	*TRAP C*	*TRAP D*
Mean	2.6833	11.2282	2.6833	7.8391	2.6833	16.5122	11.2282	7.8391
Variance	17.0000	36.0616	17.0000	8.0718	17.0000	21.8457	36.0616	8.0718
Observations	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Hypothesized Mean Differ	0.0000		0.0000		0.0000		0.0000	
df	9.0000		9.0000		10.0000		7.0000	
t Stat	-2.8734		-2.5222		-5.4349		1.2496	
P(T<=t) one-tail	**0.0092**		**0.0163**		**0.0001**		**0.1258**	
t Critical one-tail	1.8331		1.8331		1.8125		1.8946	
P(T<=t) two-tail	0.0184		0.0326		0.0003		0.2516	
t Critical two-tail	2.2622		2.2622		2.2281		2.3646	

t-Test: Two-Sample Assuming Unequal Variances

	TRAP C	*TRAP E*	*TRAP D*	*TRAP E*
Mean	11.2282	16.5122	7.8391	16.5122
Variance	36.0616	21.8457	8.0718	21.8457
Observations	6.0000	6.0000	6.0000	6.0000
Hypothesized Mean Differ	0.0000		0.0000	
df	9.0000		8.0000	
t Stat	-1.7009		-3.8841	
P(T<=t) one-tail	**0.0616**		**0.0023**	
t Critical one-tail	1.8331		1.8595	
P(T<=t) two-tail	0.1232		0.0046	
t Critical two-tail	2.2622		2.3060	

WITH a </= .05

TRAP A IS SIGNIFICANTLY DIFFERENT THAN B, P =	**0.0047**
TRAP A IS SIGNIFICANTLY DIFFERENT THAN D, P =	**0.0309**
TRAP C IS SIGNIFICANTLY DIFFERENT THAN B, P =	**0.0092**
TRAP D IS SIGNIFICANTLY DIFFERENT THAN B, P =	**0.0163**
TRAP E IS SIGNIFICANTLY DIFFERENT THAN B, P =	**0.0001**
TRAP E IS SIGNIFICANTLY DIFFERENT THAN D, P =	**0.0023**

CERATOPOGONIDAE

t-Test: Two-Sample Assuming Unequal Variances

	TRAP A	*TRAP B*	*TRAP A*	*TRAP C*	*TRAP A*	*TRAP D*	*TRAP A*	*TRAP E*
Mean	4.3002	1.0000	4.3002	6.2154	4.3002	5.6792	4.3002	3.7194
Variance	8.7305	0.0000	8.7305	18.7589	8.7305	17.9265	8.7305	11.1256
Observations	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Hypothesized Mean Difference	0.0000		0.0000		0.0000		0.0000	
df	5.0000		9.0000		9.0000		10.0000	
t Stat	2.7359		-0.8948		-0.6542		0.3192	
P(T<=t) one-tail	**0.0205**		**0.1971**		**0.2647**		**0.3781**	
t Critical one-tail	2.0150		1.8331		1.8331		1.8125	
P(T<=t) two-tail	0.0410		0.3942		0.5293		0.7561	
t Critical two-tail	2.5706		2.2622		2.2622		2.2281	

t-Test: Two-Sample Assuming Unequal Variances

	TRAP B	*TRAP C*	*TRAP B*	*TRAP D*	*TRAP B*	*TRAP E*	*TRAP C*	*TRAP D*
Mean	1.0000	6.2154	1.0000	5.6792	1.0000	3.7194	6.2154	5.6792
Variance	0.0000	18.7589	0.0000	17.9265	0.0000	11.1256	18.7589	17.9265
Observations	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Hypothesized Mean Difference	0.0000		0.0000		0.0000		0.0000	
df	5.0000		5.0000		5.0000		10.0000	
t Stat	-2.9496		-2.7070		-1.9971		0.2169	
P(T<=t) one-tail	**0.0160**		**0.0212**		**0.0512**		**0.4163**	
t Critical one-tail	2.0150		2.0150		2.0150		1.8125	
P(T<=t) two-tail	0.0319		0.0424		0.1023		0.8327	
t Critical two-tail	2.5706		2.5706		2.5706		2.2281	

t-Test: Two-Sample Assuming Unequal Variances

	TRAP C	*TRAP E*	*TRAP D*	*TRAP E*
Mean	6.2154	3.7194	5.6792	3.7194
Variance	18.7589	11.1256	17.9265	11.1256
Observations	6.0000	6.0000	6.0000	6.0000
Hypothesized Mean Difference	0.0000		0.0000	
df	9.0000		9.0000	
t Stat	1.1184		0.8906	
P(T<=t) one-tail	**0.1462**		**0.1982**	
t Critical one-tail	1.8331		1.8331	
P(T<=t) two-tail	0.2924		0.3963	
t Critical two-tail	2.2622		2.2622	

WITH a </= .05

TRAP A IS SIGNIFICANTLY DIFFERENT THAN B, P = **0.0205**

TRAP C IS SIGNIFICANTLY DIFFERENT THAN B, P = **0.0160**

TRAP D IS SIGNIFICANTLY DIFFERENT THAN B, P = **0.0212**

TABANIDS

t-Test: Two-Sample Assuming Unequal Variances

	TRAP A	*TRAP B*	*TRAP A*	*TRAP C*	*TRAP A*	*TRAP D*	*TRAP A*	*TRAP E*
Mean	6.8887	1.0000	6.8887	7.7038	6.8887	8.4680	6.8887	5.1161
Variance	23.9880	0.0000	23.9880	11.2716	23.9880	11.2752	23.9880	7.6688
Observations	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Hypothesized Mean Differ	0.0000		0.0000		0.0000		0.0000	
df	5.0000		9.0000		9.0000		8.0000	
t Stat	2.9451		-0.3362		-0.6514		0.7717	
P(T<=t) one-tail	**0.0160**		**0.3722**		**0.2655**		**0.2312**	
t Critical one-tail	2.0150		1.8331		1.8331		1.8595	
P(T<=t) two-tail	0.0321		0.7444		0.5310		0.4625	
t Critical two-tail	2.5706		2.2622		2.2622		2.3060	

t-Test: Two-Sample Assuming Unequal Variances

	TRAP B	*TRAP C*	*TRAP B*	*TRAP D*	*TRAP B*	*TRAP E*	*TRAP C*	*TRAP D*
Mean	1.0000	7.7038	1.0000	8.4680	1.0000	5.1161	7.7038	8.4680
Variance	0.0000	11.2716	0.0000	11.2752	0.0000	7.6688	11.2716	11.2752
Observations	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Hypothesized Mean Differ	0.0000		0.0000		0.0000		0.0000	
df	5.0000		5.0000		5.0000		10.0000	
t Stat	-4.8910		-5.4477		-3.6409		-0.3942	
P(T<=t) one-tail	**0.0023**		**0.0014**		**0.0074**		**0.3508**	
t Critical one-tail	2.0150		2.0150		2.0150		1.8125	
P(T<=t) two-tail	0.0045		0.0028		0.0149		0.7017	
t Critical two-tail	2.5706		2.5706		2.5706		2.2281	

t-Test: Two-Sample Assuming Unequal Variances

	TRAP C	*TRAP E*	*TRAP D*	*TRAP E*
Mean	7.7038	5.1161	8.4680	5.1161
Variance	11.2716	7.6688	11.2752	7.6688
Observations	6.0000	6.0000	6.0000	6.0000
Hypothesized Mean Differ	0.0000		0.0000	
df	10.0000		10.0000	
t Stat	1.4564		1.8863	
P(T<=t) one-tail	**0.0880**		**0.0443**	
t Critical one-tail	1.8125		1.8125	
P(T<=t) two-tail	0.1760		0.0886	
t Critical two-tail	2.2281		2.2281	

WITH a </= .05

TRAP A IS SIGNIFICANTLY DIFFERENT THAN B, P = **0.0160**

TRAP C IS SIGNIFICANTLY DIFFERENT THAN B, P = **0.0023**

TRAP D IS SIGNIFICANTLY DIFFERENT THAN B, P = **0.0014**

TRAP E IS SIGNIFICANTLY DIFFERENT THAN B, P = **0.0074**

TRAP D IS SIGNIFICANTLY DIFFERENT THAN E, P = **0.0443**