

## COMPARISON OF A CHICK-BAITED TRAP WITH THE CDC MINIATURE LIGHT TRAP<sup>1</sup>

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The relative efficiency of a chick-baited trap (Bellany & Reeves, 1952; Dow, R. P. *et al.*, 1964) and the CDC miniature light trap (Sudia & Chamberlain, 1962) in collecting different species of female mosquitoes at different seasons of the year was analyzed at the Encephalitis Research Center from collection data obtained in 1964-1965. No published comparison of these two collecting methods on a trap-night basis is known, though both types of traps were used in the Tampa Bay area of Florida during the 1962 St. Louis encephalitis epidemic (Dow *et al.*, 1964).

The area where both types of traps were operated was a fresh-water swamp of approximately ten acres in northern Hillsborough County, about 12 miles northwest of Tampa, Florida. The predominant vegetation consisted of pine, cypress, maple, wax myrtle, and bay, with palmetto and live oaks on the higher ground which drained toward the swamp. At times of high water the swamp was continuous with an adjacent lake. In May 1964, a case of western equine encephalomyelitis (WEE) occurred in a horse (Jennings *et al.*, 1966) which had been pastured in this wooded area.

During May 1964, three species of mosquitoes, *Aedes infirmatus*, *Aedes atlanticus-tormentor* (probably entirely *atlanticus* in this area), and *Culiseta melanura*, were caught in the swamp in large numbers, particularly in the light traps. From specimens obtained at this location in the same

period, WEE virus was isolated from *C. melanura* and *A. infirmatus* as well as the horse. Eastern equine encephalitis (EEE) was isolated from *C. melanura* and *A. infirmatus*, and a virus of the California group was isolated from *A. atlanticus-tormentor*.

**METHODS.** Both bait and light traps were operated on the same night, usually once each week, a total of four to six times each month. From one to ten bait traps (usually 3 or 5) and from one to six light traps (usually 2) were located at intervals of 50 to 200 feet or more. The average ratio of about two bait traps for each light trap was similar in the warmer and cooler months of the year, but not necessarily in different months. In this article, "summer" is used for the warmer months of April through September and "winter" for the cooler months of October through March. Two "summers" and one "winter" are included in this study. The traps were set between 10 a.m. and 2 p.m., and picked up between 8 and 9 a.m. on the following morning.

The bait traps were made from 50-pound lard cans and baited with a 2- to 4-week-old white leghorn cockerel in a small screened cage. The miniature light traps were equipped with a 3.2-volt radio panel light bulb and a 3-4.5 volt Distler motor. From May 1964 through June 1965, these traps were powered by a 6-volt battery (with a resistor in the line), and from July through September 1965, by a 4-volt battery, after removal of the resistor.

**RESULTS.** Total collections of females and average females per trap-night of all species, both by trap type and by season, are presented in Table 1. Together both types of traps took 24 species in 432 trap nights. The monthly averages per trap night and the ratios of average light trap to average bait trap collections (LT/BT)

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TABLE I.—Comparison of two methods of trapping adult female mosquitoes in Hillsborough County, Florida, 1964/65. Seasonal averages per trap night.

(Trap nights) Mosquito species	Summer—Apr. thru September '65				May thru September '64				Winter—Oct. '64 thru Mar. '65			
	Light trap		Bait trap		Light trap		Bait trap		Light trap		Bait trap	
	Number	Average	Number	Average	Number	Average	Number	Average	Number	Average	Number	Average
<i>Aedes atlanticus-tormentor</i> *	1,622	16.22	124	.62	0	..	0	..	0	..	0	..
<i>infirmatus</i> *	659	6.59	664	3.33	6	.15	95	1.00	6	.15	95	1.00
<i>triseriatus</i>	7	.07	0	..	0	..	0	..	0	..	0	..
<i>vexans</i>	4	.04	0	..	0	..	0	..	0	..	0	..
<i>taeniorhynchus</i>	3	.03	0	..	0	..	0	..	0	..	0	..
<i>fulvus pallens</i>	1	.01	0	..	0	..	0	..	0	..	0	..
<i>Anopheles crucians</i>	3,650	36.50	4	.02	686	18.05	2	.02	686	18.05	2	.02
<i>quadrimaculatus</i>	58	.58	0	..	9	.23	0	..	9	.23	0	..
<i>Culex nigripalpus</i> *	16,880	168.80	12,195	61.28	524	13.78	3,369	35.46	524	13.78	3,369	35.46
( <i>Melanoconion</i> ) species	1,318	13.18	775	3.89	175	4.60	1,016	10.69	175	4.60	1,016	10.69
<i>salinarius</i>	48	.48	13	.06	38	1.00	158	1.66	38	1.00	158	1.66
<i>terrilians</i>	178	1.78	0	..	12	.31	0	..	12	.31	0	..
<i>quinquefasciatus</i>	2	.02	4	.02	2	.05	8	.08	2	.05	8	.08
<i>restuans</i>	0	..	0	..	2	.05	12	.12	2	.05	12	.12
<i>Culiseta melanura</i> *	1,868	18.68	153	.76	582	15.31	243	2.55	582	15.31	243	2.55
<i>Mansonia perturbans</i>	50	.50	88	.44	4	.10	0	..	4	.10	0	..
<i>indubitans</i>	1	.01	0	..	0	..	0	..	0	..	0	..
<i>Psorophora ferox</i>	11	.11	143	.71	0	..	5	.05	0	..	5	.05
<i>ciliata</i>	25	.25	0	..	0	..	0	..	0	..	0	..
<i>howardii</i>	14	.14	0	..	0	..	0	..	0	..	0	..
<i>confinis</i>	4	.04	0	..	0	..	0	..	0	..	0	..
<i>Uranotaenia lowii</i>	608	6.08	0	..	169	4.44	0	..	169	4.44	0	..
<i>sapphirina</i>	500	5.00	0	..	292	7.68	0	..	292	7.68	0	..
<i>Wyomyia mitchellii</i>	0	..	4	.02	0	..	0	..	0	..	0	..

\* These species are further represented in Table 2.

TABLE 2.—Monthly averages per trap night and light trap/bait trap ratio\* of adult mosquitoes—Tampa Bay area, Florida, 1964-1965.

Mosquito species	**Temp	Summer 1964					Winter 64-65					Summer 1965						
		May	June	July	August	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	August	Sept.
<i>Culex nigripalpus</i>		0.3	3.8	50.1	640.5	191.2	18.3	25.9	12.8	2.8	25.6	7.3	15.3	1.8	60.7	229.8	764.7	311.0
	Bait	1.1	1.4	20.7	110.4	94.9	116.1	49.4	30.0	20.5	27.3	7.3	4.3	1.0	35.5	105.8	290.7	237.2
	Ratio	0.2	2.7	2.4	5.8	2.0	0.2	0.5	0.4	0.1	0.9	1.0	3.6	1.8	1.7	2.2	2.6	1.5
<i>Aedes triseriatus</i>		5.1	0.7	12.9	5.3	1.2	..	..	..	..	..	0.7	1.0	..	4.4	18.0	12.3	0.5
	Bait	3.9	0.6	9.3	2.6	1.6	2.6	0.06	0.04	0.3	..	2.9	1.1	..	0.8	6.3	6.4	0.6
	Ratio	1.3	1.2	1.4	2.0	0.8	..	..	..	..	..	0.2	0.9	..	5.5	2.9	1.9	0.8
<i>Aedes albopictus</i>		37.2	2.6	18.0	111.3	9.5	..	..	..	..	..	..	0.2	..	1.2	8.6	26.7	2.3
	Bait	0.6	0.1	2.0	1.8	0.07	..	..	..	..	..	..	0.1	..	0.08	0.3	1.1	0.2
	Ratio	62.0	26.0	9.0	61.8	135.7	..	..	..	..	..	..	2.0	..	15.0	28.7	24.3	11.5
<i>Culiseta melanura</i>		21.8	5.4	12.0	22.0	16.0	12.7	22.0	9.4	6.2	26.3	20.0	43.3	15.5	4.8	11.6	40.6	21.5
	Bait	9.6	0.4	0.2	0.1	0.1	0.7	1.9	2.4	3.6	1.1	3.7	1.1	0.4	0.04	0.3	0.9	0.8
	Ratio	2.3	13.5	60.0	220.0	160.0	18.1	11.6	3.9	1.7	23.9	5.4	39.4	38.8	120.0	38.7	45.1	26.9

\* Ratio = Monthly average per trap night (light trap).

\*\* Ratio = Monthly average per trap night (bait trap)

\*\*\* = Monthly average temperature (sunset plus 1 hour) at trapping area, as recorded during trap nights.

for the four major vectors of virus in this area are shown in Table 2, and the seasonal ratios are illustrated in Figure 1. Ratios greater than 1.0 indicate a higher average in the light trap.

*Culex nigripalpus*. The average light trap collection exceeded the average bait

trap collection from June to September in both years, and was less than the average bait trap collection in the 5 months from October through February. The records for May were not in agreement in the 2 years.

*Aedes infirmatus*. The average light

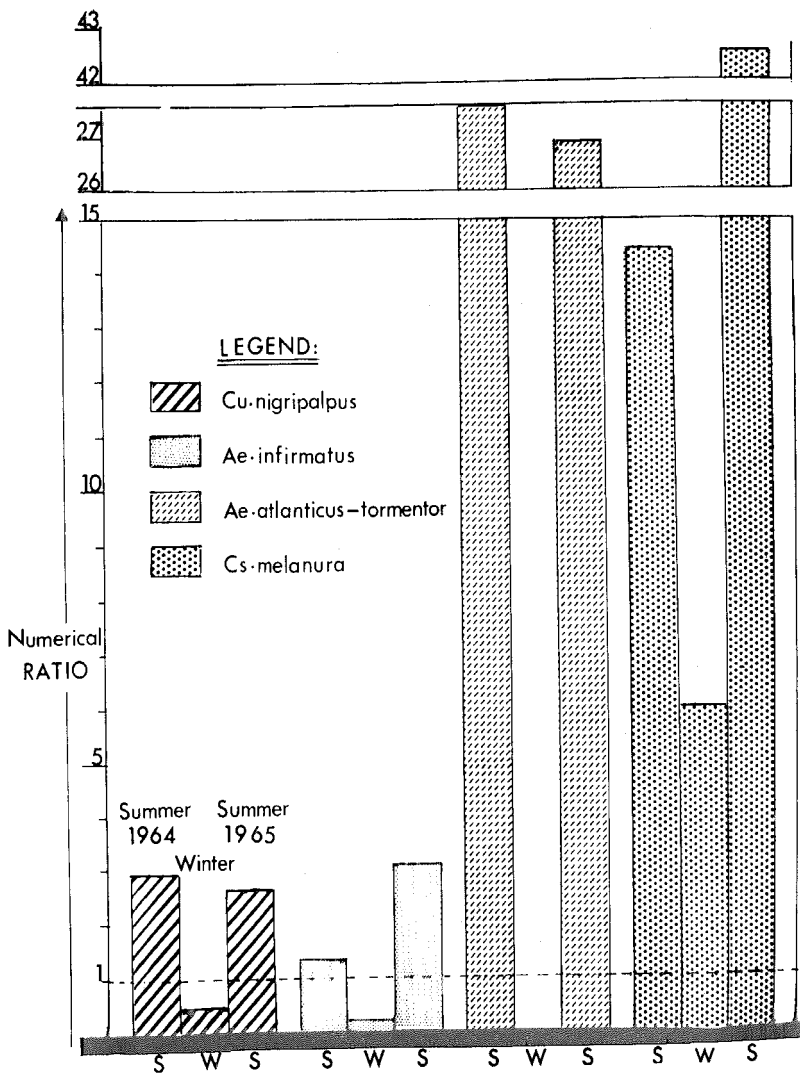


FIG. 1.—Light trap÷bait trap ratios of adult mosquitoes by species and season—Hillsborough County, Florida, 1964-65.

trap collection exceeded the average bait trap collection from June through August in both years, but was less than the average bait trap collection in September of both years, and in March and April of 1965. The species was rarely collected in the months of October through February.

*Aedes atlanticus-tormentor*. The average light trap collection exceeded the average bait trap collection in every month that the species occurred; no specimens were taken, however, in the months from October through March.

*Culiseta melanura*. The average light trap collection exceeded the average bait trap collection in every month from May 1964 through September 1965. The LT/BT ratio, however, was much lower in the winter months, even though it never dropped below 1.7.

OTHER SPECIES. *Anopheles crucians*, *Culex territans*, *Uranotaenia sapphirina*, and *Uranotaenia lowii* were rarely or never collected in bait traps, but were readily taken in the light traps (Table 1). Eight other species of the genera *Aedes*, *Mansonia*, and *Psorophora*, which were collected in small numbers, occurred only in the light trap in summer. *Culex salinarius* and *Culex restuans* occurred primarily or entirely in the winter when both were taken in larger numbers by the bait trap.

DISCUSSION. This study clearly demonstrates significant differences in the light trap-bait trap ratios between summer and winter seasons. The four species studied varied among themselves in the amplitude of this seasonal difference. Whether the differences were due to temperature, other meteorologic variables, moonlight (Provost, 1959; Bidlingmayer, 1964), or a combination of several such factors cannot be determined from this study. Further planned observations are necessary and will be performed to elicit the causal relationship behind the general observations made during the course of our routine collections.

SUMMARY. The CDC miniature light trap caught 23 of the 24 species of female mosquitoes taken; the chick-baited trap caught only 12 of them.

The LT/BT ratio (based on average numbers of females per trap night) was usually greater than 1.0, in some species always so (*Culiseta melanura*, for example) and in some species only in the warmer half of the year (*Culex nigripalpus*, *Aedes infirmatus*). Even in the species always more abundant in light traps, there was a tendency for the bait trap collections to be relatively higher in the colder half of the year.

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