

MOSQUITO CONTROL AND SURVEY IN JEFFERSON COUNTY, KENTUCKY¹

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INTRODUCTION

In the summer of 1956 St. Louis encephalitis was diagnosed for the first time in the Louisville, Kentucky, area. Before the end of that autumn an epidemic had existed, with 110 confirmed cases and 13 fatalities. The fatalities were mostly among elderly persons (Dr. Malcolm Barnes, personal communication). There were five confirmed cases in 1957, and have been none since.

As a result of the epidemic, the Louisville-Jefferson County Department of Public Health carried out temporary *Culex pipiens* control measures in 1956 and 1957, and by spring, 1958, had established a permanent mosquito control project. Mr. John C. Barwick, Chief of Food and Sanitation Division, was administrative head, and Mr. Clarence E. Kammer was appointed Field Supervisor. Under Kammer were three sanitarians and three equipment operators. Today the two administrative positions mentioned above are held by Mr. John W. Leake and Mr. Wayne L. Sanders, respectively. The staff now includes three sanitarians, four equipment operators, and seven laborers.

CONTROL METHODS. The mission of the Mosquito Control Project is primarily to reduce the population of *Culex pipiens* breeding in Jefferson County, and thus prevent further epidemics of St. Louis encephalitis. A secondary goal is to reduce the population of *Aedes vexans* by pre-hatch treatment of certain flood plain areas near the Ohio River with 25 percent

DDT in No. 4 vermiculite as carrier, spread by a Buffalo turbine duster and Cyclone hand dusters. Some anti-annoyance benefit is also gained by controlling other species breeding in ditches and catch basins along with *C. pipiens*, and by treating other areas routinely or upon receipt of complaints from citizens.

Larviciding is carried out using 25 percent DDT emulsifiable concentrate diluted to 5 percent with No. 2 diesel oil (1 percent DDT in catch basins). Application is by means of Bean 200-gallon hydraulic sprayers mounted on half-ton pickup trucks, by three-wheel motorcycles carrying 30-gallon sprayers, and by 3-gallon hand sprayers. Small isolated areas are treated using Toss-Its. Equipment is thus available to treat efficiently such areas as long, wide ditches; catch basins; and small spots inaccessible to larger, vehicle-mounted equipment.

SURVEY METHODS. Along with treatment of ditches and catch basins, a constant survey is made to determine species and numbers present, especially in catch basins and ditches. Sanitarians take larval dip samples in these and other sites before treatment, roughly assess the number of individuals per dip, place the larvae in vials of alcohol, and submit them to the entomological consultant for identification. Report slips accompany the samples, giving date, location, number of larvae per dip, and name of person taking sample. Number of larval samples totaled 1,398 during 1965-1967 and involved 20 mosquito species (Table 1).

Adults have been collected by hand occasionally, but the main means of survey has been by using New Jersey light traps stationed in six localities representing various terrain and degree of environmental disturbance in Jefferson County.

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TABLE 1.—Mosquito species and frequency of appearance, 1958–1967.

Species	Larvae	Adults
<i>Aedes atlanticus</i>	..	R
<i>Aedes canadensis</i>	I	I
<i>Aedes cinereus</i>	..	R
<i>Aedes grossbecki</i>	..	R
<i>Aedes mitchellae</i>	R	..
<i>Aedes sollicitans</i>	I	I
<i>Aedes sticticus</i>	..	R
<i>Aedes triseriatus</i>	I	C
<i>Aedes trivittatus</i>	I	C
<i>Aedes vexans</i>	A	A
<i>Anopheles crucians</i>	..	R
<i>Anopheles punctipennis</i>	C	C
<i>Anopheles quadrimaculatus</i>	I	C
<i>Culex erraticus</i>	R	R
<i>Culex pipiens</i> complex	A	A
<i>Culex restuans</i>	A	A
<i>Culex salinarius</i>	R	I
<i>Culex tarsalis</i>	R	R
<i>Culex territans</i>	C	I
<i>Culiseta inornata</i>	I	I
<i>Culiseta melanura</i>	..	R
<i>Mansonia perturbans</i>	..	R
<i>Orthopodomyia signifera</i>	..	I
<i>Psorophora ciliata</i>	I	I
<i>Psorophora confinnis</i>	C	C
<i>Psorophora cyanesces</i>	R	I
<i>Psorophora discolor</i>	R	R
<i>Psorophora ferox</i>	R	R
<i>Psorophora horrida</i>	..	I
<i>Psorophora varipes</i>	R	R
<i>Uranotaenia sapphirina</i>	R	I
Total: 31 species		

Legend: A—Abundant.

C—Common.

I—Infrequent in collections.

R—Rare in collections.

The traps are run one night a week. The cyanide jar collection containers are emptied and the contents sent to the consultant the morning after the collecting night. The mosquitoes are separated out, mounted on card points, and identified by the consultant. The specimens are retained in the University of Louisville insect collection. A total of 2,440 adults representing 24 species have been identified during 1965–1967 (Table 3).

Detailed survey information has been prepared in the Annual Reports of the Louisville-Jefferson County Mosquito Control Project each year beginning 1958. It is thought that the control efforts have been at least partly responsible for the

absence of St. Louis encephalitis from the Louisville area since 1957.

SURVEY RESULTS. The survey techniques mentioned above were initiated in 1958. Identifications of adults were made in that year by Mr. James Hawkins of the Kentucky State Department of Health. In 1960, Dr. Paul Christian, then entomologist at the University of Louisville, was appointed consultant to the Mosquito Control Project, and made identifications and reports in 1960 and 1961. After his departure to Minnesota, Dr. Fred Knapp, Department of Entomology, University of Kentucky, continued this work through 1964. The author has held the consultantship since 1965. Species taken in larval and/or adult samples from 1958 through 1967 total 32 species, and are listed in Table 1. A more precise breakdown by months, giving numbers of specimens identified, is given in Table 2 for larvae and Table 3 for adults during 1965–1967, the author's tenure in this project.

The notations indicating frequency of species as given in Table 1 are not to be taken to indicate true frequency in nature in Jefferson County; they reflect only frequency in collections made. However, I feel that the "Abundant" species—*Culex pipiens*, *Culex restuans*, and *Aedes vexans*—are the dominant species in this area, with *Psorophora confinnis* usually in fourth place. Those species indicated as "Common" are found often, but not usually in very great numbers each year. Those considered "Infrequent" are found in very small numbers almost every year; and those labelled "Rare" have appeared less than 5 times in samples over the 10-year period (some are unique specimens).

In addition to the 32 species listed here, the following (with frequency notations) were recorded from Jefferson County by Quinby, Serfling, and Neel (1944), and included in Carpenter and LaCasse (1955):

Aedes aegypti (C)*Aedes dorsalis* (R)*Aedes nigromaculis* (R)*Anopheles barberi* (R)

TABLE 2.—Monthly larval records 1965-1967.

Species	March	Apr.	May	June	July	Aug.	Sept.	Oct.	3 year totals	
									Sam- ples	* Spec- imens
<i>Aedes canadensis</i>	..	*3	..	..	..	1	1	..	5	30
<i>Aedes mitchellae</i>	1	..	..	1	1
<i>Aedes sollicitans</i>	1	..	..	..	1	3
<i>Aedes triseriatus</i>	1	..	..	..	1	15
<i>Aedes trivittatus</i>	1	..	..	..	1	..	2	6
<i>Aedes vexans</i>	1	2	32	28	35	40	11	54	153	1,164
<i>Anopheles punctipennis</i>	3	2	5	4	4	1	19	35
<i>Anopheles quadrimaculatus</i>	2	..	1	3	3
<i>Culex erraticus</i>	1	..	..	1	2
<i>Culex pipiens complex</i>	..	4	26	146	214	233	187	64	874	10,294
<i>Culex restuans</i>	..	24	77	59	14	28	22	8	232	1,607
<i>Culex salinarius</i>	1	..	..	1	..	2	6
<i>Culex tarsalis</i>	1	..	1	1
<i>Culex territans</i>	7	3	2	..	3	1	16	62
<i>Culiseta inornata</i>	..	3	5	..	1	..	..	..	9	46
<i>Psorophora ciliata</i>	2	1	..	..	3	3
<i>Psorophora confinnis</i>	7	8	23	28	8	1	75	352
<i>Psorophora cyanoescens</i>	1	..	..	..	1	1
<i>Psorophora discolor</i>	1	..	..	1	1
<i>Psorophora ferox</i>	1	..	..	..	..	..	1	1
Grand totals:									1,398	13,633

* Total larval samples during 1965-1967.

TABLE 3.—Monthly adult records 1965-1967.

Species	May	June	July	Aug.	Sept.	Oct.	3
							year total
<i>Aedes canadensis</i>	*4	1	..	..	..	..	5
<i>Aedes cinereus</i>	..	..	2	..	..	..	2
<i>Aedes grossbecki</i>	6	..	..	..	..	..	6
<i>Aedes sollicitans</i>	..	..	..	4	2	..	6
<i>Aedes sticticus</i>	3	1	1	..	..	..	5
<i>Aedes triseriatus</i>	14	3	14	45	3	..	79
<i>Aedes trivittatus</i>	1	4	..	5	26	..	36
<i>Aedes vexans</i>	136	273	445	103	182	7	1,146
<i>Anopheles punctipennis</i>	3	14	24	20	32	6	99
<i>Anopheles quadrimaculatus</i>	..	1	4	5	10	..	20
<i>Culex erraticus</i>	..	..	1	..	..	..	1
<i>Culex pipiens complex</i>	48	90	161	230	244	54	827
<i>Culex restuans</i>	35	29	5	13	22	9	113
<i>Culex salinarius</i>	1	3	..	2	..	..	6
<i>Culex territans</i>	3	..	..	1	..	3	7
<i>Culiseta inornata</i>	..	..	1	1	2	2	6
<i>Culiseta melanura</i>	..	..	1	1	..	..	2
<i>Orthopodomyia signifera</i>	..	1	1	1	..	..	3
<i>Psorophora ciliata</i>	..	..	1	3	2	..	6
<i>Psorophora confinnis</i>	1	..	6	10	19	..	36
<i>Psorophora cyanoescens</i>	1	..	..	1	1	..	3
<i>Psorophora ferox</i>	2	..	..	..	..	..	2
<i>Psorophora horrida</i>	2	..	1	..	8	..	11
<i>Uranotaenia sapphirina</i>	..	..	3	7	3	..	13
Total adults:							2,440

* Total specimens during 1965-1967.

Culex peccator (R)
Psorophora howardi (R)

Other Jefferson County species in the University of Louisville Collection include *Aedes thibaulti* and *Culex nigripalpus* collected by Mr. Thomas Floore, and *Toxorhynchites rutilus septentrionalis* collected by Dr. Burt Monroe, Jr. Thus 41 mosquito species are known from Jefferson County, Kentucky.

References

Annual Reports of Mosquito Project, Louisville-Jefferson County Department of Public Health, 1958-1967 (unpublished).

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