in the same locations, with treatments and controls rotated among the four locations at each house to reduce bias.

Data were collected from a total of 46 observations for each insecticide and control over a 4-month period from August to December 1973. Oviposition was fairly low during these observations, the total for the study being 2,053 eggs (5.6 eggs/trap per observation period).

In determining starting concentrations, we recognized that excessive quantities of insecticide are frequently applied, especially to small or nearly dry containers. The starting concentrations of 2% malathion and 0.5% for Abate were reduced in successive tests until no effect could be observed.

Results are shown in Figure 1. Malathion was repellent at concentrations above 125 ppm, but at 20 and 125 ppm it had no apparent effect. Abate was repellent at all levels tested, down to and including 50 ppm. The study was discontinued before a nonrepellent concentration of Abate could be found.

As far as I am aware, this is the first demonstration of insecticide avoidance by ovipositing mosquitoes under field conditions. The problem was suggested as a potential factor in *aegypti* eradication (McClelland 1967); and Jakob (1969) found that 2 amine ovicides repelled ovipositing females when treated tires were placed in a large cage containing *Ae. aegypti*. Von Windeguth et al. (1971) also suggested that avoidance might have occurred during their studies of several larvicides in Florida.

In order to determine the extent to which avoidance represents a practical problem, more detailed studies are needed to accurately determine the limits of repellency by these and other larvicides. It also remains to be determined whether this type of avoidance is a widespread phenomenon, and whether other species or populations vary in ability to detect the presence of insecticides in potential oviposition sites.

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DIROFILARIA IMMITIS ENCAPSULATION IN *AEDES AEGYPTI*

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Encapsulation of filarial nematodes by mosquito intermediate hosts is a commonly observed phenomenon. However, few studies correlate extent of filarial encapsulation with type of larva and with site of encapsulation within the mosquito. Although Kartman (1956) presented quantitative data on *Dirofilaria immitis* microfilarial encapsulation in *Aedes aegypti*, the present study quantitates *D. immitis* encapsulation in *Ae. aegypti* and relates it to larval type and location within the mosquito.

The colony of *Ae. aegypti* at Southern Illinois University had been maintained for 3 years prior to the onset of this investigation. Mosquitoes were housed at 24°C to 26°C, 60% to 80% relative humidity and sustained on sugar solution. Blood meals were provided twice a week using anesthetized New Zealand White rabbits. A beagle possessing a microfilaremia of approximately 34,000 microfilariae per milliliter of blood served as a source of *D. immitis* infection. Mosquitoes were killed using carbon dioxide, necropsied in insect saline (Taylor 1960) and examined for *D. immitis* larvae. Results for three infections are summarized in Table I.

Viable microfilariae (mf) were observed 48 and 72 hr postinfection in Malpighian tubule (mt) lumina. Sausage stage (ss) larvae first appeared 72 hr postinfection in Malpighian tubule cells. This development was expected and corresponded to studies by Taylor (1960). Second stage larvae (L^2) were recovered on days 14 through 16, and 3rd stage larvae (L_3) were recovered on days 17 through 18 postinfection. Encapsulated microfilariae and sausage stage larvae were first observed 4 days postinfection. Encapsulated larvae were associated only with Malpighian tubules exhibiting cellular damage. Larvae were completely encapsulated and non-motile. As seen in Fig. 1, microfilariae were most susceptible to encapsulation on days 7 and 9 through 13 with 100% encapsulation. Sausage stage larvae were encapsulated to a lesser extent, and 2nd and 3rd stage larvae were not encapsulated.

Although Brug (1932) did not consider mosquito encapsulation of filarial nematodes a successful means

Table 1.—*Dirofilaria immitis* encapsulation in *Aedes aegypti*.

		Microfilariae						Sausage Stage Larvae			L_2 Mt.			L_3					
		Mg.			Mt.									Haemocoel			Proboscis		
Day Post-infection	No. Mosq. Necropsied	No. Rec.	No. Encap.	% Encap.	No. Rec.	No. Encap.	% Encap.	No. Rec.	No. Encap.	% Encap.	No. Rec.	No. Encap.	% Encap.	No. Rec.	No. Encap.	% Encap.	No. Rec.	No. Encap.	% Encap.
0	15	584	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	17	441	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	20	33	0	0	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	19	12	0	0	14	0	0	14	0	0	0	0	0	0	0	0	0	0	0
4	17	2	0	0	18	14	77.8	13	2	15.4	0	0	0	0	0	0	0	0	0
5	20	0	0	0	17	10	58.8	21	7	33.3	0	0	0	0	0	0	0	0	0
6	16	2	0	0	11	5	45.5	9	1	11.1	0	0	0	0	0	0	0	0	0
7	18	1	0	0	15	15	100.0	12	0	0	0	0	0	0	0	0	0	0	0
8	13	0	0	0	6	1	16.7	5	1	20.0	0	0	0	0	0	0	0	0	0
9	16	0	0	0	7	6	85.7	7	0	0	0	0	0	0	0	0	0	0	0
10	13	0	0	0	6	6	100.0	6	0	0	0	0	0	0	0	0	0	0	0
11	12	0	0	0	6	6	100.0	6	0	0	0	0	0	0	0	0	0	0	0
12	14	0	0	0	5	5	100.0	8	0	0	0	0	0	0	0	0	0	0	0
13	12	0	0	0	6	6	100.0	6	0	0	0	0	0	0	0	0	0	0	0
14	13	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0
15	13	0	0	0	0	0	0	2	0	0	7	0	0	1	0	0	0	0	0
16	14	0	0	0	6	0	0	0	0	0	0	10	0	2	0	0	0	0	0
17	14	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3	0	0
18	27	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	6	0	0
Total	303	1075	0	0	180	74	41.1	111	11	9.90	18	0	0	6	0	0	9	0	0

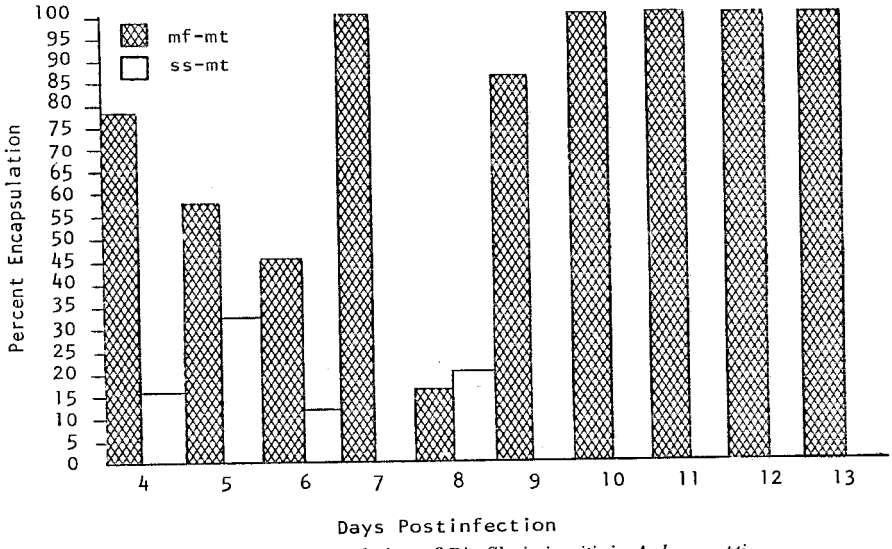

Fig. 1. Percent encapsulation of *Dirofilaria immitis* in *Aedes aegypti*.

of defense, it does appear that encapsulation reduces the parasitic load and may influence vector efficiency of *Ae. aegypti*.

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SOURCE REDUCTION IN BOX ELDER COUNTY, UTAH, 1976

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Box Elder County covers an area of 5594 sq. miles, or over three and a half million acres. The mosquito control area covers approximately 3,000 sq. mi., of which approximately 400,000 acres are active mosquito-breeding sources, and over one-half million acres of potential or semi-active areas. Source reduction is a large part of our program.

In 1974 the district purchased a 1201C Spryte® wide-track vehicle with the Thiokol® speed-scavel. Transporting all this new equipment required 2 trucks, 2 trailers and a great deal of time and manpower. After using the original design and this method of transporting, we felt that modifications were necessary. First we needed a more efficient way to transport the equipment to the job site. So the district purchased a new 1-ton long-wheel-base flat bed truck, with a heavy duty hitch. Then special ramps were constructed on the trailer and our transportation problems were solved. We now need only one truck and trailer to move the equipment anywhere in the county. The next step was modifying the speed-scavel. Those modifications were made in our own shop using scrap