Ruritan Club project. The members collected the tires, sank them, and the Mosquito Control District cooperated.

The following method was used:

1. The tires were stockpiled on shore.
2. The tires were transported by boat to a raft which was anchored at the site of the proposed reef.
3. A nylon rope was tied to a cement block and the block dumped overboard.
4. One tire at a time was threaded on the nylon rope.
5. The air was let out of the tire by the special air escape tube (this was the key to the operation) and the tire rapidly sank.
6. After sinking about 25 tires, another concrete block was ties to the nylon rope and dumped overboard.
7. Successive units were laid on top of each other.

Divers have observed the reefs and have reported fish around them and that there was a growth on the tires.

The pilot project has been considered successful and it is now planned to go into it on a larger scale. The extended plan will be basically a Ruritan Club project. They will collect the tires from certain tire dealers. They will furnish all the labor in sinking the tires. They will collect the 35¢ per tire which will be used to further their civic projects.

Mosquito control will assist by lending equipment and overseeing the project.

It can be seen that the benefits will be threefold: (1) Many old tires will be eliminated, reducing mosquito breeding places (2) the fishing will be improved and (3) the Ruritan Club will make money to advance their civic projects.

LARVAL MOSQUITO CONTROL IN PIPELINES WITH A MODIFIED NON-THERMAL AEROSOL GENERATOR

CLIFFORD RAY JOHNSON AND PAUL A. GIEKE

Eastside Mosquito Abatement District,
2000 Santa Fe Avenue,
Modesto, California 95355

Insecticidal dust applications have been used successfully in California to control adult mosquito populations in underground irrigation pipelines (Silveira and Mulhern 1961), but associated problems such as mosquito resistance to chemicals and dust handling difficulties have limited the usefulness of the method. Gieke (1976) provided an alternative method which has proved successful in controlling adult populations of *Culex pipiens* in irrigation pipelines. This paper reports on the effectiveness of this same method against larval populations of *Cx. pipiens*.

The cold fogger used in this study was described by Gieke (1976) and the same mixture and flow rate used earlier was used in these tests. Ten fl oz of Dursban 6-lb fogging compound were mixed with 118 fl oz of GB-1111 to make a 1.6-lb/gal solution. A flow rate of 7.5 fl oz/min (0.09375 AI/min) was used in all tests. Applications of 1, 2 and 3 min were employed against the mosquito larvae. Trials were conducted at various locations in the Eastside MAD. Six trials were conducted with the 1-min application period, and one each for the 2 and 3-min periods.

For each test, a premeasured 30-in pipeline was selected. Twenty 2nd and 3rd instar *Cx. pipiens* larvae (from the colonies of the University of California, Fresno, Mosquito Laboratory) were placed in 120 ml of distilled water in Dixie® cups. The suspended cups were introduced into the pipelines through surface standpipes at various distances from the application point and usually at the end of the pipeline. Controls were also established. The chemical was released at specific intervals of 1, 2 or 3 min, after which the blower was allowed to run until the white cloud of insecticide emerged from the last standpipe. All tests were conducted with an open pipeline. All tests were conducted with an open pipeline system (standpipes uncovered) (Gieke 1976). After exposure the cups were retrieved and transported back to the laboratory and observed at intervals for mortality.

Mortality was 100% in all tests (Table 1), and no mortality occurred in the control populations. During the 1-min test, with a mean distance of 480.67 ft from the point of release to the 1st cup, there was 100% mortality within 5 hr of application. The mortality at the second cup, mean distance 970.2 ft, was 70.8%. In 4 of the 1-min tests, a 3rd cup was used, mean distance 1380.6 ft, and a 50% mortality was achieved. With the exception of 1 trial, all larvae died within 24 hr of the 1-min application. With the 2- and 3-min applications, 100% mortality was achieved within 3 hr, regardless of pipe length.

The aerosol created by the modified cold

Table 1. Results of field trials with Dursban as a larvicide in pipelines

	Pipeline	Treatment	Distance to Cups			% Mortality/hrs			Hrs to 100%
1	1173	1	445	843	1173	100/2	100/2	100/2	2
2	1415	1	495	1093	1415	100/5	40/5	0/5	17
3	1130	1	417	902	1130	100/2	85/2	0/2	15
4	887	1	527	887	—	100/5	0/5	—	28
5	1805	1	511	1101	1805	100/1	100/2	100/2	2
6	1435	1	489	995	—	100/3	100/3	—	3
7	885	2	325	885	—	100/3	100/3	—	3
8	1061	3	313	590	1061	100/3	100/3	100/3	3

fogger will move through a pipeline with larvicidal effects. Percent mortality in relation to time was random. Dursban and GB–1111 oil proved to be a satisfactory insecticidal mixture for the control of *Cx. pipiens* larvae in irrigation pipelines.

References Cited

Gieke, P. A. 1976. Adult mosquito control in pipelines with a modified non-thermal aerosol generator. Mosquito News 36:280–283.

Silveira, S. and Mulhern, T. D. 1961. An effective method of distributing insecticidal dust throughout underground pipelines to control mosquitoes. California Vector Views 8:38–41.

BIPOLAR GYNANDROMORPH OF *AEDES FITCHII*[1]

JAMES T. KARDATZKE

U.S. Army Medical Bioengineering Research & Development Laboratory, Fort Detrick, Frederick, Maryland 21701

In June 1975 a female *Aedes fitchii* (Felt and Young) was collected at Rowley Bay, Door County, Wisconsin, while feeding on a human. Eggs from the female were conditioned to a hatchable state using procedures described and cited by Kardatzke (1976). After collection, neither this female nor her eggs were exposed to temperatures in excess of 21°C. In March 1976, 50 eggs from this single female were hatched at 10°C using cysteine to reduce the level of dissolved oxygen (Kardatzke 1977). Approximately 40 normal appearing larvae hatched. These were reared in 2 trays at 21°C in a non-saline medium as described by Kardatzke and Liem (1972). When adults, the siblings were mated using induced copulation (McDaniel and Horsfall, 1957 as modified by Novak and Liem, 1975). During this procedure the gynandromorph was discovered.

The gynandromorph of *Ae. fitchii* was bipolarly differentiated into male and female. The antennae, maxillary palpi, and proboscis were female in appearance. The genitalia were entirely male. All other siblings from this female were normal and mated. Normal viable eggs were obtained from these matings.

This is the first report of a non-thermally induced gynandromorph of *Ae. fitchii*. It was a phenotypic expression of a genotype and not related to environmental stress. This also is the first incidence where the gynandromorph was directly related to its siblings and mother.

References Cited

Kardatzke, J.T. 1976. Maintenance and transportation of female mosquitoes collected in the field. Mosquito News 36:527–29.

Kardatzke, J.T. 1977. Hatching of northern *Aedes* (Diptera: Culicidae) at low temperatures. Ann. Entomol. Soc. Am. 70:663–4.

Kardatzke, J.T. and K.K. Liem. 1972. Growth of *Aedes stimulans* and *A. vexans* (Diptera: Culicidae) in saline solution. Ann. Entomol. Soc. Am. 65:1425–6.

McDaniel, I.N. and W.R. Horsfall. 1957. In-

[1] The opinions or assertions contained herein are the private views of the author and are not to be construed as official or as reflecting the views of the Department of the Army or the Department of Defense.