machines operating each night in previous summers. Two trucks were operated in July as a result of heavy rains causing flooding and the subsequent emergence of large populations of floodwater mosquitoes.

More extensive surveillance to locate the source of breeding and routine larviciding of breeding sites allowed Richland County to limit the expensive ULV spraying to 312 gallons of malathion as compared to over 600 gallons the previous year. It is felt that adequate control was achieved at a lowered cost due to the increased surveillance and inspection done by the 3 field inspectors. Areas were treated according to mosquito density as determined by light trap collections, landing rate and resting station counts, and oviposition traps collected rather than simply by citizen requests.

In summary, it is possible to deliver high quality control on a small budget if one is willing to utilize the material on hand more efficiently. Give more concentrated time to surveillance and public education at minimal cost, and the need for high cost chemical treatment is lessened proportionately.

## SELF-INSURANCE COVERAGE [1] FOR LOSS OF EQUIPMENT

JACK SALMELA
Director, Brevard Mosquito Control District, Titusville, Fl. 32780

The Brevard Mosquito Control District became self-insured for loss of equipment in 1971. At that time the district had the following coverage:

| | |
|---|---|
| 1. Helicopter—hull | $7,734.00 |
| 2. Airplanes—hull, not in motion | 2,232.00 |
| 3. Draglines | 1,284.00 |
| Total | $11,250.00 |

The premium on a 2nd helicopter to be delivered that same year, plus an increase in premium which had gone in effect, would have increased this premium to $20,000 or more per year. A loss of at least one helicopter every third year would be required to justify such a premium. Therefore, it was decided to go self-insured.

House Bill 1503 was passed May 22, 1971 permitting a self-insured fund. $45,000 was budgeted the first year, $75,000 the second, and $100,000 thereafter.

In five years of being self-insured, $100,000 has been saved in premiums, and $19,883.76 has been earned in interest through September, 1975. The present certificate is earning $7,625.00.

The $100,000 presently in the bank has been made possible at no cost to the district, and the district is saving at least $20,000 in premiums, and earning over $7,000 in interest each year. In addition, all equipment is presently covered. Previously the district had no coverage for vehicles, and the airplanes were covered only while not in motion.

The district is presently considering either compounding the interest to increase the coverage each year, or possibly, catastrophic coverage. This is a "not in motion" sort of policy to cover major losses such as fire. Coverage of this type is relatively inexpensive, and the interest earned on $100,000 should more than pay this premium. In either case, our equipment would still be covered at no additional cost to the district other than the $100,000 which was deposited in the bank in lieu of payments on premiums.

[1] Presented at the Forty-seventh Annual Meeting of the Florida Anti-Mosquito Association, Longboat Key, Florida, May 2–5, 1976.

## OCCURRENCE OF *ORTHOPODOMYIA ALBA* BAKER AND *ORTHOPODOMYIA SIGNIFERA* (COQUILLETT) IN MICHIGAN [1]

PAUL R. GRIMSTAD

Vector Biology Laboratory, University of Notre Dame, Notre Dame, IN 46556

The distribution of *Orthopodomyia signifera* extends over the District of Columbia and 36 states including the Michigan border states of Illinois, Indiana, and Ohio (Zavortink 1968) while that of *O. alba* extends over the District of Columbia and 19 states including Illinois, Indiana, and Ohio (Brooks 1947, Ross 1947, Zavortink 1968).

Previous to this report, the apparent single record of the genus *Orthopodomyia* in Michigan was of a single female collected in a light trap in the mid-1940's and was identified only to genus; this was reported in an unpublished M.S. thesis (H. D. Newson, pers. comm.).

Collections made over a 2-year period in Warren Woods State Park, Berrien County, in southwestern Michigan, have yielded several hundred larvae of *O. alba* and less than 50 *O. signifera*. All larval collections have been from beech (*Fagus*

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*grandifolia*) treeholes. *Orthopodomyia alba* larvae have been collected from early May through mid-September (7,14,28 May, 19 June, 16 July, 30 July, 11 August, 11 September, 1976), while *O. signifera* have been collected only from mid-July into mid-September (16,30 July, 11 August, 11 September, 1976). Collections were made over a similar time period in 1975 also.

A distinct difference in water conditions has been noticed for the larval habitat of each species. *Orthopodomyia alba* has been collected only from beech treeholes in which very dark coffee-colored water rich in organic matter occurs, while *O. signifera* has been collected only from beech treeholes in which the water is considerably clearer and darkened only by suspended dirt particles. Other species associated with *O. alba* in collections were *Aedes bendersoni*, and *Anopheles barberi; Aedes triseriatus* and *Anopheles barberi* were found in association with *O. signifera.* The significance of this differential larval habitat and species association in beech treeholes is under investigation.

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## A SPECIAL STUDY TO SHOW LARVAL DENSITIES IN RELATION TO WATER DEPTH

W. I. BARTON

Hennepin County Supervisor, Metropolitan Mosquito Control District, 1802 Como Ave., St. Paul, Mn. 55108

We studied species and species densities in relation to water depth to show our *Aedes* problem to our staff. We firmly believe that most of our mosquito problem is produced in areas that are dry much of the time and wet some of the time. Thus, the thought was that we would find the heaviest densities of *Aedes* in fairly shallow water.

In the 15 sites studied 14 had heaviest densities in the 1 to 6 in. depths. In the 13 in. depth or deeper, densities were very light or nil. Even in shallow sites breeding larvae of other genera the heaviest larval densities were in 1 to 6 in. of water.

We realize the chance of "spooking" immatures when wading in deep water is good. We tried to minimize this effect in this study. We concluded that the greatest numbers of any species were in 1 to 6 in. of water. These 15 sites were studied between May 27 and June 8. Species found were: *Culiseta inornata* and *Ae. vexans* which were predominant, some *Cx. territans, restuans, tarsalis* as well as some *Ae. sticticus* and *Ae. canadensis.* If this study had been done earlier in the year our univoltine *Aedes* might have shown us a different picture.

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## AN *IN VITRO* FEEDING TECHNIQUE FOR ARTIFICIALLY DEMONSTRATING VIRUS TRANSMISSION BY MOSQUITOES[1]

THOMAS H. G. AITKEN

Senior Research Associate, Yale University School of Medicine, Yale Arbovirus Research Unit, Department of Epidemiology and Public Health, 60 College Street, New Haven, Connecticut 06510, U.S.A.

Certain viruses that are possibly transmitted by insects do not lend themselves readily to experimental insect transmission studies for lack of suitable laboratory recipient hosts. The available animal hosts do not produce apparent infections following injection of virus by a peripheral route (such as provided by a feeding mosquito). They may not produce viremia or even antibodies after various methods of virus exposure. Moreover it is not always possible to achieve a favorable feeding response even when a satisfactory host animal is available. Therefore several *in vitro* techniques were explored to overcome this difficulty. One method, utilizing *Aedes aegypti*, which proved successful is described here.

Glass capillary tubing (7 cm long and ± 1 mm outer diameter) is drawn to a fine point in a tiny flame. The capillary orifice should be capable of easily receiving the mosquito's proboscis. Feeding of unconfined mosquitoes is accomplished by inserting the *entire* proboscis into the finely-drawn capillary containing 0.005 ml of heat-inactivated defibrinated chicken blood and per-

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