produced indicator oil formulations that were dispensable (flowable) and effective in monitoring the presence or absence of Arosurf MSF after being held in 30 ml dispensing bottles for over 1 week at 2°C, even though some precipitates and stratification/flocculation of the formulation components were observed. Solubilization of the precipitates and disappearance of the stratification/flocculation occurred upon return of the indicator oil formulations to room temperature. Tests with additional alcohols as well as other solvent formulations are planned to determine if improved indicator oils or Adol 85 formulations can be developed.

Laboratory data have indicated that the viscosities and/or spreading rates of Arosurf MSF and Adol 85 on a mosquito habitat or in storage was affected by low ambient and water temperatures. Therefore, the following recommendations are suggested to insure the effective operational utilization of the products: (1) point source introduction of Arosurf MSF on a mosquito habitat should be avoided—product should be evenly sprayed over the surface of the water whenever possible; (2) further evaluations of alcohol-Arosurf MSF blends should be conducted to determine if improved product formulations can be developed; (3) alcohol-base Adol 85 indicator oil formulations should be used to achieve satisfactory flowability for use in back checking a mosquito habitat for Arosurf MSF persistence; and (4) bulk products should be stored indoors whenever possible—outdoor storage at near freezing temperatures should be avoided, particularly in respect to Adol 85.

In summary, results of physical evaluations have indicated that it is feasible to use Arosurf MSF or Arosurf MSF-alcohol formulations to control mosquito larvae and pupae at low ambient and water temperatures. Also, alcohol-base-Adol 85 formulations can be used to monitor post-treatment persistence of Arosurf MSF in mosquito habitats. Field trials with Arosurf MSF and Adol 85, and alcohol formulations of these products are planned in several low temperature geographical areas of the USA and overseas.

References Cited

Levy, R., W. D. Garrett, J. J. Chizzonite and T. W. Miller, Jr. 1980a. Control of *Culex* spp. mosquitoes in sewage treatment systems of southwestern Florida with monomolecular organic surface films. Mosq. News 40:27–35.

Levy, R., J. J. Chizzonite, W. D. Garrett and T. W. Miller, Jr. 1980b. Control of immature mosquitoes through applied surface chemistry. Proc. Fla. Anti-Mosq. Assoc. 51(2):68–71.

Levy, R., J. J. Chizzonite, W. D. Garrett and T. W. Miller, Jr. 1981. Ground and aerial application of a monomolecular organic surface film to control salt-marsh mosquitoes in natural habitats of southwestern Florida. Mosq. News 41:291–301.

Levy, R., J. J. Chizzonite, W. D. Garrett and T. W. Miller, Jr. 1982a. Efficacy of the organic surface film isostearyl alcohol containing two oxyethylene groups for control of *Culex* and *Psorophora* mosquitoes: Laboratory and field studies. Mosq. News 42:1–11.

Levy, R., J. J. Chizzonite, W. D. Garrett and T. W. Miller, Jr. 1982b. Control of larvae and pupae of *Anopheles quadrimaculatus* and *Anopheles crucians* in natural paludal ponds with the monomolecular surface film isostearyl alcohol containing two oxyethylene groups. Mosq. News 42:172–178.

Levy, R., C. M. Powell, B. C. Hertlein, W. D. Garrett and T. W. Miller, Jr. 1982. Additional studies on the use of the monomolecular surface film Arosurf® 66–E2 for operational control of mosquito larvae and pupae. J. Fla. Anti-Mosq. Assoc. 53(2):100–106.

Reiter, P. 1978. The influence of dissolved oxygen content on the survival of submerged mosquito larvae. Mosq. News 38:334–337.

A DOUBLE-SIPHON *HAEMAGOGUS EQUINUS* LARVA

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The occurrence of double-siphon mosquito larvae appears to be very rare and we have been unable to find any report of this type of larva in the literature. We report here the occurrence of a *Haemagogus equinus* Theobald larva with two siphons.

On April 21, 1983 four conventional ovitraps (Fay and Eliason 1966) were set between 1 and 2 meters high on branches of shrubs at Orange Hill, Tobago. This was part of a routine trapping program for the collection of *Aedes berlini* Schick eggs. The paddles were removed on April 28, 1983 and were returned to the laboratory. After a 3-wk period of drying, the four paddles containing 142 eggs were flooded in a

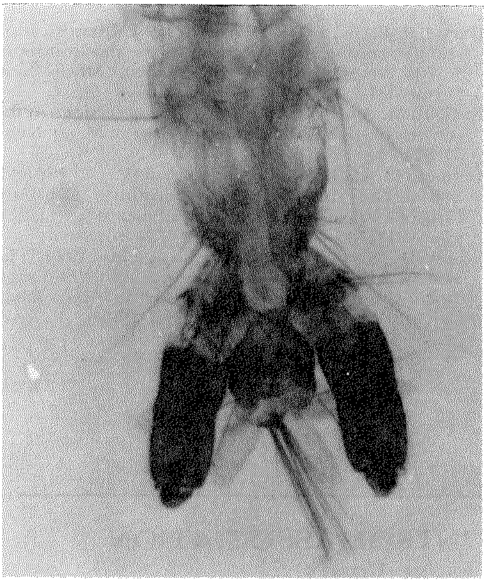

Fig. 1. Double-siphon of *Haemagogus equinus* larva from Tobago, W.I. Specimen cleared in phenol.

single container. Approximately fifty larvae emerged. When the larvae were at about the third stage they were examined microscopically to separate *Ae. berlini* from *Hg. equinus* as the eggs of these two species are not readily distinguished from each other. One of the larvae was noticeably smaller in size and was observed to have two siphons (Fig. 1). This larva was separated from the others, but died 4 days later. All the other larvae were also *Hg. equinus*. The paddles were flooded 2 wk later and more *Hg. equinus* emerged.

Workers at the former Trinidad Regional Virus Laboratory, now the Caribbean Epidemiology Centre (CAREC) have examined thousands of mosquito larvae over a period of 25 years, but this type of aberrant larva has not been heretofore observed. The specimen has been deposited in the CAREC collection.

We thank Mr. Ambrose Guerra for field and laboratory assistance.

Reference Cited

Fay, R. W. and D. A. Eliason. 1966. A preferred oviposition site as a surveillance method for *Aedes aegypti* Mosq. News 26:531–535.

A FURTHER ADDITION TO THE MOSQUITOES OF ALBERTA

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The efficacy of mosquito control programs and the abundance of *Culex tarsalis* Coquillett, the vector of Western equine encephalitis, are monitored annually by the Pesticide Chemicals Branch of Alberta Environment. This is accomplished by the use of New Jersey light traps set up at various locations in southern Alberta. In September 1982, adult specimens of the tree hole species, *Aedes hendersoni* Cockerell, were tentatively identified from light trap collections taken in Medicine Hat the previous July. The specimens were badly damaged and too brittle to make a positive identification. However, the fact that the trap was situated in a mature stand of riverine balsam poplars (*Populus balsamifera*) lent support to this tentative identification.

At the beginning of June 1983, light traps were again positioned at various locations in southern Alberta including Medicine Hat, where the trap was set up at the same location as that of 1982. In July, during a search of the balsam poplars in the vicinity of this trap, a rot hole containing larvae of *Ae. hendersoni* was found. These larvae confirmed the presence of this species in the area. Dr. D. M. Wood of the Biosystematics Research Institute in Ottawa verified the identification, and placed specimens in the national collection.

Identification of the 1983 light trap material by the senior author, using the key of Wood et al. (1979), again produced adult specimens of *Ae. hendersoni* from Medicine Hat. In addition a