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LARVAL DIAPAUSE IN *AEDES HENDERSONI* AND *AEDES TRISERIATUS* FROM SOUTHERN MANITOBA

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The mosquitoes *Aedes hendersoni* Cockerell and *Aedes triseriatus* (Say) are sympatric sibling species that breed in tree rot holes (Zavortink 1972). These species occur in Manitoba (Gallaway and Brust 1982), where they overwinter in the egg stage (Wood et al. 1979). Larval diapause has been demonstrated in *Ae. triseriatus* populations from as far north as 46° N latitude (Sims 1982). There is no published information on larval diapause in *Ae. hendersoni.*

Larvae from field collected eggs and the F1 generation of laboratory colonies were used to investigate larval diapause in *Ae. hendersoni* and *Ae. triseriatus* populations from Winnipeg, Manitoba (49° 52″ N latitude). Larvae from eggs collected from tree holes in late April, 1982, were reared at 20°C, 16L:8D or 8L:16D. Larvae from the laboratory colonies (maintained by forced copulation of adults) were reared at 16° C and photoperiods changing in 1 hour increments from 16L:8D to 10L:14D. The number of larvae used per test ranged from 21 to 75. Larvae not pupating after 50 days from the day of hatch were considered to be in larval diapause.

Diapause occurred in larvae of both species from field collected eggs when reared at 20°C, 8L:16D (Table 1). Diapause did not occur in any of the larvae from the laboratory colonies. Larval diapause was more prevalent in *Ae. triseriatus* than *Ae. hendersoni* (Table 1). The lower percentage of diapausing larvae in the May 5 group (Table 1) may have been due to the eggs being stored at 20°C, 16L:8D for 6 days before they were hatched, while those of April 20 were hatched on the day of collection. The duration of daylength plus civil twilight at 50° N latitude is 17.1 hr on June 15 and 8.8 hr on December 15 (Beck 1980), therefore a photoperiod of 8L:16D is not one naturally encountered by the larvae of these species at this latitude. Sims observed larval diapause at 16° C, 11L:13D in *Ae. triseriatus* collected at 46° N latitude. The short photoperiods to which my colony larvae were subjected should have induced diapause. It may be that another factor besides photoperiod and temperature influences larval diapause in these species.

Table 1. Numbers of *Aedes triseriatus* and *Aedes hendersoni* larvae from field collected eggs not pupating during a 50 day period, starting at the time of hatch. Larvae were reared at 20° C.

Photoperiod	Date of hatch	Species: *Ae. triseriatus*	Species: *Ae. hendersoni*
16L:8D	April 20	0/68* (0.0%)	0/26 (0.0%)
8L:16D	April 20	58/65 (89.2%)	9/27 (33.3%)
8L:16D	May 5	9/28 (32.1%)	2/21 (9.5%)

* Fourth stage larvae alive at end of period/fourth stage larvae + pupae.

This is the farthest north that larval diapause has been demonstrated in *Ae. triseriatus* and to my knowledge the first time this response has been demonstrated in *Ae. hendersoni.* In Manitoba this response to short photoperiod could be of no importance in overwintering because the larvae would freeze during the winter, the average frost free period for Winnipeg being 121 days/year (Anonymous 1982). It has been suggested that unpredictable spring weather may be responsible for the persistence of larval diapause in northern populations of *Ae. triseriatus* (Holzapfel and Bradshaw 1981, Sims 1982). Intermittent warm and cold periods and short photoperiods may induce larval diapause, halting development until conditions are more suitable for adult survival.

I would like to thank R. A. Brust, University of Manitoba, for his assistance. I am grateful for the financial support received from the National Sciences and Engineering Research Council of Canada grant A 2545 to R. A. Brust.

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A BLOOD MEAL ANALYSIS OF ENGORGED MOSQUITOES FOUND IN RIFT VALLEY FEVER EPIZOOTICS AREAS IN KENYA[1]

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Epizootic Rift Valley fever (RVF) occurs in Kenya in grasslands adjacent to, within or derived from natural forest, and in the bushed and wooded grasslands with predominantly *Combretum* or *Acacia* tree cover (Davies 1975). These are in ecological zones II–IV described by Pratt et al. (1966), in their classification of East African habitat. Epizootics occur after periods of prolonged and heavy rainfall (Scott et al. 1956, Davies 1975, Davies and Highton 1980, Davies et al., unpublished data). The virus is transmitted by mosquitoes during RVF epizootics (Daubney and Hudson 1933, McIntosh 1972, Davies and Highton 1980). A knowledge of the mosquitoes found in such areas during epizootic and interepizootic periods is relevant to a greater understanding of the natural history of RVF. In this study we examined 739 blood-fed mosquitoes trapped during and following a period of particularly heavy rainfall (October–December 1982), which did not generate an epizootic of RVF. However, during this period the virus was isolated from mosquitoes at the trapping sites, and from one dead calf on a nearby farm; there were also 4 seroconversions in a group of 80 yearling cattle tested at one of the trapping sites (Davies, unpublished data). The emergence of mosquito species appeared to be similar to that occurring during the early stages of RVF epizootics (Linthicum et al. 1983, 1984a).

Mosquitoes were trapped with Solid State Army Miniature light traps (John W. Hock, Co., Gainesville, FL) at known RVF epizootic sites in ecological zones II (1°14′ 30″S, 36° 50′E; 1700 m) and III (1° 12′S, 37°E; 1500 m) in the vicinity of Nairobi, Kenya. Studies concerning the natural history of RVF during epizootics (Davies 1975, Davies and Highton 1980), the population biology of immature mosquitoes in dambos (Linthicum et al. 1983, 1984a) and the feeding habits of mosquitoes at human and calf bait (Linthicum et al. 1984b) have been conducted at these sites. The domestic animals present in these areas were predominantly cattle, with a few goats, horses and sheep. The common wild animals present were: bushbuck (*Tragelaphus scriptus*), eland (*Taurotragus oryx*), Grant's gazelle (*Gazella granti*) and Thomson's gazelle (*Gazella thomsonii*), giraffe (*Giraffa camelopardalis*), jackal (*Canis mesomelas*), ostrich (*Struthio camelus*), reedbuck (*Redunca redunca*) and zebra (*Equus burchelli*). Light traps were suspended 50–80 cm above the ground and baited with CO_2 (2 kg dry ice). The traps were generally placed adjacent to emergence sites (flooded dambo formations). Specimens were obtained in 380 trap night collections made during the period October 15, 1982 to February 15, 1983. One to eight traps were set 4–7 days a week at each study site. The catches were taken to the laboratory live, frozen at −70°C for 30 min and then examined. All blood-fed specimens were removed and their abdomens smeared onto filter paper, labelled and stored in a desiccator jar. The smeared area of the filter paper was later cut out and placed in 0.5 ml of a phosphate buffered saline which continued 0.1% M sodium azide as a preservative.

Blood meal identification was carried out by an enzyme immunoassay system developed by Lindqvist, Gathuma and Kaburia (1982) for use in East Africa, and many conjugates had been prepared against the domestic and wild ruminants found in this region. The antispecies—antisera were produced in rabbits, goats or sheep by weekly inoculations of the different

[1] This work was supported by Research Grant No. DAMD17–83–G–9517 from the U.S. Army Medical Research and Development Command, Ft. Detrick, MD 21701 and by a Research Grant for Project No. 3792 by the Overseas Development Administration, United Kingdom.

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