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MERMITHID PARASITES OF CANADIAN ANOPHELINES

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Mermithid parasites of mosquitoes in Canada have been reported sporadically in the literature (e.g., Steiner 1924, Hearle 1926, Jenkins & West 1954, Beckel & Copps 1955, Welch 1960, Trpis et al. 1968, Trpis 1971, Brust & Smith 1972, Ellis and Brust 1973, Ross & Smith 1976, and Galloway & Brust 1976). Whereas many of these records have excited mosquito researchers, a thorough survey of Canada has yet to be made. We hope that publication of these records will stimulate such a national survey.

While collecting study material in July, 1973, for a handbook on the "Mosquitoes of Canada" (Wood, Dang & Ellis, in press), the senior author chanced upon a shallow permanent farm pond (approximately 10×20m) fed by artesian springs near St-Francois-de-Masham (45°38'N, 76°6'W), Quebec. Second, 3rd & 4th stage larvae and pupae of several *Anopheles* species were collected. In attempting associated rearings, developing nematodes became apparent, but efforts to rear these through to adults were not successful.

The nematodes parasitizing *Anopheles walkeri* Theobald *An. earlei* Vargas and *An. punctipennis* (Say) were identified by J. J. Petersen of the Lake Charles laboratory as *Diximermis*, probably *peterseni* Nickle, the only known species in the genus. *D. peterseni* is known to parasitize *An. crucians* Wiedemann (LA, FL), *An. quadrimaculatus* Say (LA) and *An. punctipennis* (LA, NY) (Petersen 1973). Our Canadian records represent an unsuspected northern range of the nematode and are the 1st records of its presence in *An. earlei* and *An. walkeri*. Indeed, it is the 1st instance of any nematode being reported as a parasite in these 2 species. Although multiple infections and encapsulated nematodes were present, the high level of parasitism (50–60%) observed in all 3 species suggests some potential for their biological control.

In addition to the nematodes, a microsporidian, *Parathelphania* sp., parasitized some larvae of *An. earlei*. This also is a new Canadian and host record.

Considering the fortuitous nature of these observations, we can only hope that they will provide the needed stimulus for a comprehensive Canadian survey to determine the distribution and importance of mermithids as agents of biological control.

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EVIDENCE FOR THE TRANSOVUM TRANSMISSION OF A CHIRONOMID ENTOMOPOXVIRUS[1,2]

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Previous studies of the epizootiology of an entomopoxvirus (EPV) in a nuisance midge species (*Chironomus decorus* complex) designated as *Chironomus* #51 (Biever 1965) have shown the virus to be an important regulatory factor (Harkrider and Hall 1978 & 1979). These studies have dealt with the most obvious method of transmission, the dissemination of virus inclusion bodies (IBs) in the environment. Once prevalent in the population, the virus probably is most often horizontally transmitted by healthy larvae feeding on IBs released from distintegrating, dead, infected larvae. However, it remains unclear how the EPV is introduced into an environment newly invaded by *C.* #51. Epizootics of EPV were observed in areas only inhabited by the midge larvae during the late summer months (Harkrider and Hall 1978). During this study 20 egg masses were collected in the field, before the appearance of the virus, and were reared in the laboratory. Eleven of these egg masses produced at least one EPV infected larva per egg mass. This suggested the possibility of transovum transmission of the chironomid EPV via a few individuals.

Vertical or transovum transmission has been demonstrated for a number of insect viruses, and it is an important mechanism for the maintenance of virus populations. For example, the demonstration of vertical transmission of the La Crosse virus in *Aedes triseriatus* (Watts et al. 1973) provided new insight into the overwintering of this pathogen.

This study was undertaken to demonstrate the possibility of vertical transmission of an EPV in midge populations under controlled laboratory conditions.

METHODS AND MATERIALS. Groups of *Chironomus* #51 larvae were exposed to 7.75×10^4 IBs/cm^2 EPV at different ages (24 to 120 hr) as reported by Harkrider and Hall (1979). The larvae were reared at high density (initial density was 7.5 to 8.4 larvae/cm^2) in 250 ml rearing units. Adults emerging from these treatments were moved to fresh rearing containers and maintained at 25°C. Egg masses were collected from these adult holding units and moved to new 250 ml rearing units. Larvae hatching from these egg masses were reared at high density for 20 days in the manner described by Harkrider and Hall (1979). Surviving larvae were removed by flotation with concentrated $MgSO_4$ solution (Mulla et al. 1971) and examined for evidence of EPV infection.

RESULTS AND DISCUSSION. The data in Table 1 show that 8 of the 83 egg masses collected had larvae that developed infections with the EPV. Incidence of EPV disease among larvae was extremely low in all cases, with a maximum of only 6 infected larvae recorded from 1 unit. There was little pupal mortality noted and adult emergence in all units was high. The appearance of the EPV vertically introduced into the laboratory population is similar to the initial appearance of the virus in field populations (Harkrider and Hall 1978). Although EPV transmission by this method has little ef-

[1] Diptera: Chironomidae.

[2] This investigation was supported in part by a grant from the Orange County Vector Control District, Santa Ana, California.