OPERATIONAL AND SCIENTIFIC NOTES

MOSQUITOES INFECTED BY *ROMANOMERMIS NIELSENI*[1]

J. R. FINNEY AND J. E. MOKRY

Research Unit on Vector Pathology, Memorial University of Newfoundland, St. John's, Newfoundland, Canada A1C 5S7

The mermithid *Romanomermis nielseni* (Tsai and Grundman 1969), initially described as a species of *Reesimermis* through taxonomic confusion resolved by Ross and Smith (1976), is currently under investigation as a possible control agent for boreal mosquitoes (Finney 1978). Collections of the nematode have been made at the type locality, Lonetree, Wyoming over the last 3 years and attempts made to culture it *in vivo*. This has necessitated the evaluation of mosquito species (not necessarily prospective field targets but which could be easily reared in the laboratory) through which the mermithid could be passaged on a continuous basis. Concurrently, the susceptibility of other species, not readily cultured in the laboratory, was investigated in order to extend the list of species against which *R. nielseni* could eventually be utilized in the field. Naturally infected species include *Aedes communis, Ae. increpitus, Ae. pullatus, Ae. fitchii, Ae. cinereus,* and *Culiseta impatiens* (Tsai and Grundman 1969). In the case of *Ae. increpitus* and *Ae. pullatus*, pupae and adults were also found infected.

Groups of early instar larvae (5–30) were challenged with 1–7 preparasitic *R. nielseni*/ larvae for 2 hr depending on the availability of the nematode infective stage (Finney 1978). All mosquitoes were maintained at 17°C both during and after exposure to infection.

Ae. epactius (Group 1, Table 1) was not susceptible to infection by *R. nielseni*. Group 2 mosquitoes (Table 1) became infected when exposed to this worm, but all succumbed before completion of its parasitic phase. Petersen (1976) attempted to propagate *R. nielseni* using *Culex quinquefasciatus* and *Culiseta inornata* (Group 3, Table 1). Although melanization and encapsulation of the nematode occurred in both species some nematodes developed in *Cx. quinquefasciatus* and emerged as post-parasitic males. Only post-parasitic females emerged from Group 3 larvae exposed to *R. nielseni* in this laboratory. In larvae of *Cs inornata*, melanization of the mermithid was observed. Infected Group 4 (Table 1) larvae yielded healthy male and female post-parasites. Finney (1978) indicated that this mosquito might have possible use as an intermittent laboratory host when eggs were available. However, most of emergent nematodes subsequently failed to molt, and no mating occurred between those that did complete this

Table 1. Mosquito larvae from field collected eggs, RUVP or other laboratory cultures exposed to *R. nielseni* at RUVP or elsewhere.**

Group	Species	Source
1	*Aedes epactius*	G. Craig, Notre Dame, Indiana
2	*Ae. togoi*	M. Mogi, Nagasaki, Japan
	Ae. abserratus	Logy Bay, Newfoundland
	Ae. excrucians	Logy Bay, Newfoundland
	Wyeomyia smithii	Mt. Scio Road, Newfoundland
3	*Ae. atropalpus*	Belleville, Ontario strain, G. Craig, Notre Dame, Indiana
	Ae. atropalpus	Swift Current, Newfoundland
	Ae. cantator	Logy Bay, Newfoundland
	Culiseta inornata	R. Brust, Winnipeg, Manitoba and L. B. Hayles, Saskatoon, Saskatchewan
	***Cs. inornata*	Petersen (1976)
	***Culex quinquefasciatus*	Petersen (1976)
4	*Cx. restuans*	R. A. Ellis, Winnipeg, Manitoba
5	*Ae aegypti*	RUVP culture plus rock strain, G. Craig, Notre Dame, Indiana

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phase successfully. *Ae. aegypti* (Group 5, Table 1) is the only mosquito tested so far that will maintain *R. nielseni* through to parasitic phase with the emergence of post-parasites that will molt and mate successfully and produce viable eggs. Although susceptibility is low, use of this host does permit culture of the nematode and it will be utilized until a more efficient laboratory host can be found.

The determination of a susceptibility index (Petersen and Chapman 1979) has not been possible to date due to the erratic availability of both nematodes and mosquito larvae.

While the low preparasite challenges may be directly responsible for the predominance of emergent female post-parasites in the case of Group 3 mosquitoes, actual evidence for this has yet to be obtained.

However, the fact that infections occur and cause mortality in Group 2, 3 and 4 mosquitoes, irrespective of the suitability of these mosquitoes as hosts for maintenance of the nematode, indicated the future feasibility of inundative use of the nematode against them.

The parameters suggested by Petersen and Chapman (1979) as critical for successful field trials have still to be evaluated for both host and parasite. The further determination of such compatibility or control index is dependent on further success in the *in vivo* culture of *R. nielseni*.

References Cited

Finney, J. R. 1978. *Romanomermis nielseni* for the control of mosquitoes in Canada. Proc. Utah Mosquito Abate. Assoc. 31:47–48.

Petersen, J. J. 1976. Comparative biology of the Wyoming and Louisiana populations of *Reesimermis nielseni*, parasitic nematodes of mosquitoes. J. Nematol. 8:273–275.

Petersen, J. J. and Chapman, H. C. 1979. Checklist of mosquito species tested against the nematode parasite *Romanomermis culicivorax*. J. Med. Entomol. 15:468–471.

Ross, J. F. and Smith, S. M. 1976. A review of the mermithid parasites (Nematoda: Mermithidae) described from North American mosquitoes (Diptera: Culicidae) with descriptions of three new species. Can. J. Zool. 54:1084–1102.

Tsai, Y. H., and Grundmann, A. W. 1969. *Reesimermis nielseni* gen. *et.* sp. n. (Nematoda: Mermithidae) parasitizing mosquitoes in Wyoming. Proc. Helminth. Soc. Wash. 36:71–67.

GRANULAR APPLICATOR

DAVID COCHRAN

Collier Mosquito Control District, P. O. Box 7069, Naples, Florida 33941

Many chemicals for use in pest control are currently being marketed and labeled for granular applications. There is a problem in that the application equipment currently available is a modification of a sand blaster which is not really suited to field use due to the need for compressed air to operate the sand blaster. Furthermore it will not withstand the corrosive properties of some chemical formulations. Therefore, the need arose to develop an alternative to the traditional sand blaster. A granular applicator can be constructed from any piece of equipment that has a high volume blower, such as an old thermal fog unit. The basic modifications can be made simply and inexpensively and materials can be bought locally.

If an old thermal fogger is available, the first thing to do is to remove the protective cage and all of the thermal apparatus. This leaves the motor to drive the blower and the blower itself mounted on the base.

The exhaust of the blower is to be made vertical if it is not already a vertical exhaust blower. This can be done easily by installing a close nipple and an elbow (90°) of the same size as the exhaust port. The next step is to install the "Barco Swivel." This is acccomplished by installing a close nipple either into the vertical exhaust blower or into the elbow and screwing the swivel onto it. Roll stop brackets are installed at 180° to each other on the ball portion of the swivel to prevent sideways movement but still allow front-to-back movement and turning. Into the ball of the swivel a 4" close nipple is fitted with a galvanized "T" (Figure 1). In one end of the "T" a plug is fitted, and into the other a reducer. On the inside of the