

**Natural infections and distributions of parasitic mermithids (Nematoda: Mermithidae) infecting larval black flies (Diptera: Simuliidae) in tropical streams of Malaysia**

**ABSTRACT**

Mermithids are parasites of black flies that cause host mortality along with physical and behavioural changes in infected hosts. However, there is a lack of knowledge on the distribution of mermithids infecting black fly larvae and the factors that influence these distributions in Asia, including Malaysia. A total of 13,116 mid- to late-instar black fly larvae belonging to 42 species were collected from 138 streams across East and West Malaysia and screened for the presence of mermithid parasites. Overall, 121 mermithids were obtained from 107 (0.82%) larvae of nine (21.4%) black fly species. The average number of mermithids per black fly host was  $1.10 \pm 0.04$  (SE), ranging from one to three mermithids per host. Mermithid infection was highest in *Simulium trangense*, with a frequency of occurrence of 6.5%, followed by *S. cheongi* (5.8%) and *S. angulistylum* complex (2.9%). Infection was lowest in *S. brevipar* and *S. tahanense*, with a frequency of occurrence of 0.7% each. Regression analysis indicated that mermithid infections in larval black flies were significantly associated with cooler and shallower streams with more canopy cover, dense riparian vegetation, high dissolved oxygen, and lower conductivity and complete pH. Forward logistic regression further indicated that infections in *S. cheongi* were associated with shaded, cooler, slightly acidic streams with higher conductivity and dissolved oxygen. These findings suggest that mermithid infections in larval black flies in Malaysia are not randomly distributed and are influenced by the breeding habitat of their hosts.