LETTERS TO THE EDITOR

RE: "INFECTION OF A FIELD POPULATION OF *AEDES CANTATOR* WITH A POLYMORPHIC MICROSPORIDIUM, *AMBLYOSPORA CONNECTICUS* VIA RELEASE OF THE INTERMEDIATE COPEPOD HOST, *ACANTHOCYCLOPS VERNALIS*"

Andreadis (1989) demonstrated introduction of a microsporidian parasite, *Amblyospora connecticus* Andreadis, into larvae of *Aedes cantator* (Coquillett), by exposure to the infected cyclopoid copepod intermediate host, *Acanthocyclops vernalis* (Fischer), under simulated field conditions. In his discussion, Andreadis emphasized the possible use of this technique for suppression of natural mosquito populations. On its face the method seems promising, but actually the argument ignores some fundamental natural history.

Many species of cyclopoid copepods are predators (Fryer 1957a), and reports of these microcrustaceans attacking and consuming mosquito larvae have been accumulating for over 50 years (Hurlbut 1938). Such reports from laboratory observations list species of *Acanthocyclops*, *Cyclops* s. l., *Diacyclops*, *Macrocyclops*, *Mesocyclops*, and *Microcyclops* (Hintz 1951, Hurlbut 1938, Marten 1984, 1989, Marten et al. 1989, Nasci et al. 1987, Reid et al. 1989). In field conditions, species of *Mesocyclops* and *Megacyclops* have been observed actively predating on mosquito larvae (Lindberg 1949, Rivière, Séchan and Kay 1987, Rivière and Thirel 1981, Rivière, Kay et al. 1987). Usually it is the 1st and 2nd instar larvae that are attacked. Marten et al. (1989) have described an almost perfect correlation between the presence of any of three species of *Mesocyclops* and the absence of larvae of *Anopheles* in small ponds in Colombia. A similar correlation was found between the presence of *Macrocyclops albidus* and *Diacyclops navus*, and the absence of *Aedes* larvae in tires in New Orleans (Marten 1989). Contaminant cyclopoids eliminated larvae in outdoor cultures of *Aedes* in Colombia (Suarez et al. 1984), and "severely hampered" larval production of *Toxorhynchites brevipalpis* Theobald in Hawaii (Bonnet and Mukaida 1957). Other aquatic dipteran larvae such as chaoborids and chironomids are also consumed by species of *Acanthocyclops*, *Macrocyclops*, and *Thermocyclops* (Carvalho 1984, Fryer 1957a,b, Li et al. 1979).

Fryer (1957a) recorded remains of oligochetes, cyclopoid copepods, chydorid cladocerans and rotifers in gut contents of 15 individuals of *Acanthocyclops vernalis*, concluding that it is a "markedly carnivorous species". In fact, *A. vernalis* is an active predator of *Aedes albopictus* larvae, often eliminating them in containers of various volumes (Marten 1989).

Andreadis (1989) added slightly fewer than 1,000 copepods to drums containing about 7,000 *Ae. cantator* larvae, introduced a week previously as 1st and 2nd instars. Over the 7-week experiment he recorded larval mortalities over 90%, about half occurring during the first two weeks, and ascribed this mortality to overcrowding, competition for food, and stress. Bonnet and Mukaida (1957), Hintz (1951), and Rivière, Séchan and Kay (1987) calculated consumption rates for a single adult cyclopoid at 5–20 1st and 2nd instar larvae/day. Thus it seems easy to account for the disappearance of at least the younger larvae in Andreadis' drums. Using microsporidian-infected copepods as a mosquito suppression measure, therefore, seems unpromising. It is as if one were to try to transmit coccidia to chickens by introducing infected foxes into the henhouse.

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