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FIRST RECORD OF TRIACTINOMYXON ACTINOSPOREAN IN MARINE OLIGOCHAETE

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Abstract

Marine oligochaetes in south east Queensland have a low prevalence (0.2%) of triactinomyxon infection, an actinosporean previously reported only from freshwater oligochaetes. The size and site of development is similar to that reported in freshwater oligochaetes.

Introduction

Markiw and Wolf (1983) and Wolf *et al.* (1986) showed that a triactinomyxon actinosporean in the oligochacte *Tubifex tubifex* was the alternate stage of the myxosporean *Myxobolus cerebralis.* Several other studies have now shown actinosporeans to be alternate stages in the life cycle of myxosporean fish parasites (El-Matbouli *et al.* 1992). These studies, however, have been done exclusively in fresh water. Little is known about the life cycle of myxosporeans in the sea, even though a large number are known to infect marine fish (e.g., Lom and Dykova 1992a). Studies on the parasites of marine oligochaete worms in Queensland, Australia, have revealed several actinosporean species (Hallett *et al.* 1995, 1996). We report here the first observation of a triactmomyxon in a marine oligochacte.

Materials and methods

Samples of mud were collected from the intertidal zone at several sites on the western side of Moreton Bay. Triactinomyxon were found in oligochaetes from near the mouth of the Brisbane River and from a small bay at Hays Inlet (Fig. 1). The salinity at these sites rarely falls below 30 ppt. (Davie 1990). The mud was sieved (1, 0.8, 0.5, 0.4, 0.25mm); most oligochaetes were in the 0.5 and 0.4 mm fraction. Groups of up to 6 worms were placed on a glass slide and gently flattened with a coverslip to prevent excessive movement and the gut and coelom examined with a compound microscope for actinosporeans. Infected worms were squashed, air-dried and stained with Hemacolor (Merck). In one case mature triactinomyxon spores were liberated from a slightly compressed worm.

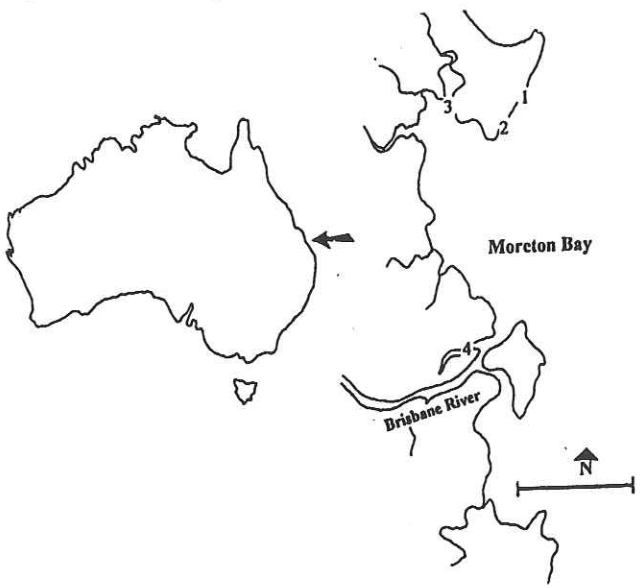

Fig. 1. Sample localities in western Moreton Bay, S.E. Queensland. I - Redcliffe Point, 2 - Scotts Point, 3 - Hay's Inlet, 4 - Boggy Creek. Scale bar = 5 km.

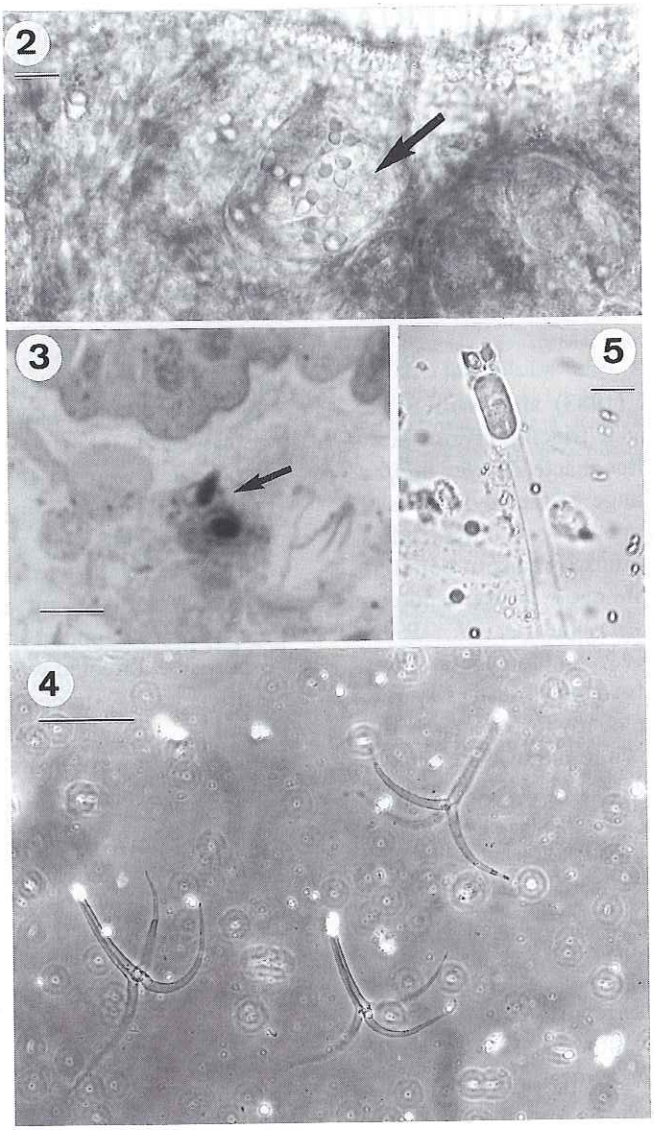

Fig. 2. Triactinomyxon pansporoblast (arrow) in gut wall of marine oligochacte. Scale bar 10µm.
Fig. 3. Polar capsules (arrow) of mature spore in gut lumen. Scale bar = 5µm.
Fig. 4. Freshly liberated spores with characteristic triactinomyxon shape. Scale bar = 100µm.
Fig. 5. Anterior end of stylet with sporoplasm and polar capsules. Scale bar = 10µm.

Results

A total of 8000 marine oligochaete worms were examined, of which 15 were infected with triactinomyxon actinosporeans. Development of the parasites occurs in a pansporoblast within the wall of the gut (Fig. 2). Mature spores are seen within the gut lumen (Fig. 3). The liberated spores have the characteristic triactinomyxon shape (Fig. 4, 5). The long stylet (102-142µm x 7.7-21.6µm) contained a sporoplasm 17.0-

17.2µm long. Three polar capsules 3.1-4.7µm long each had a polar filament with at least 3 coils. Three caudal process were 93.6-185µm long. The infected tubificid oligochaetes were in the subfamilies Limnodriloidinae and Phallodrilinae *(Duridrilus* sp.), but the poor knowledge of marine oligochaetes in Australia makes further identification difficult.

Discussion

In freshwater, a triactinomyxon in the lumbriculid worm *Stylodrilus heringianus* has been linked to *Myxobolus arcticus* (see Kent *et al.* 1993), and a triactinomyxon in the tubificid *Tubifex tubifex* to *M cerebralis* (see Markiw and Wolf 1983). Several species of *Myxobolus* have been recorded in marine fish (e.g., Lom & Dykova 1992a), but a triactinomyxon may not be the only actinosporean type associated with *Myxobolus* infection in fish. *Raabeia* sp. (Actinosporea) from the tubificid *Branchiura sowerbyi produced Myxobolus* infection in *Carassius auratus* (see Yokoyama *et al.* 1991).

The marine triactinomyxon is similar in size to that of *Triactinomyxon legeri* liberated by *Tubifex tubifex* (see Lom and Dykova 1992b). Like *T. legeri,* the marine triactinomyxon develops in the oligochaete gut wall, mature spores are released into the lumen and then liberated into the water column. We are currently investigating ultrastructural features of triactinomyxon development in

marine oligochaete to compare those features described for freshwater forms by Lom and Dykova (1992b).

The fish-parasitic myxosporeans associated with the triactinomyxons we have found in marine oligochaetes have yet to be determined. It is likely that future studies using experimental infection and DNA probes will determine which actinosporeans are associated with some of the large number of species of marine myxosporeans.

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