

Implications of hyperparasitism for studies into the myxosporean infections of oligochaetes



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Background:

While examining myxosporean infected oligochaetes, Janiszewska (1957) noted that when co-infections with other parasites occurred the myxosporean infection was notably 'slight'. Here I report on a novel hyperparasitic microsporidian affecting an Aurantiactinomyxon-type myxosporean and discuss how such infections could affect experimental results.

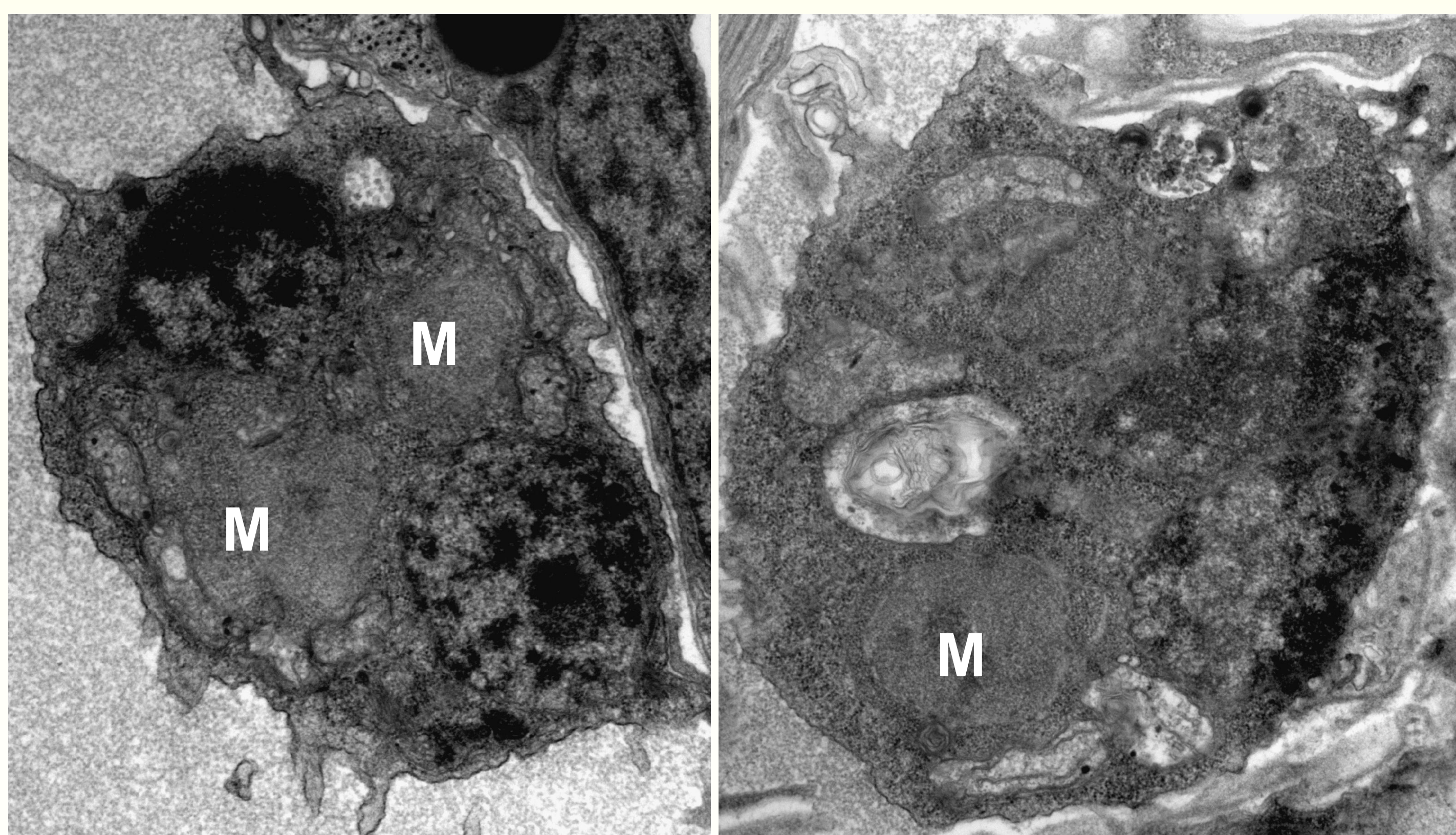
Materials and Methods:

Sediment was collected from a trout pond in Scotland. It was passed through graded sieves to remove silt and the remainder placed into a bucket prior to sorting. The material was placed into shallow dishes and oligochaetes removed to a small beaker. They were then placed individually into cell wells and examined for actinospore production using an inverted microscope.

Infected worms were fixed 7,14 and 28 days post-sorting and examined ultrastructurally.

Results:

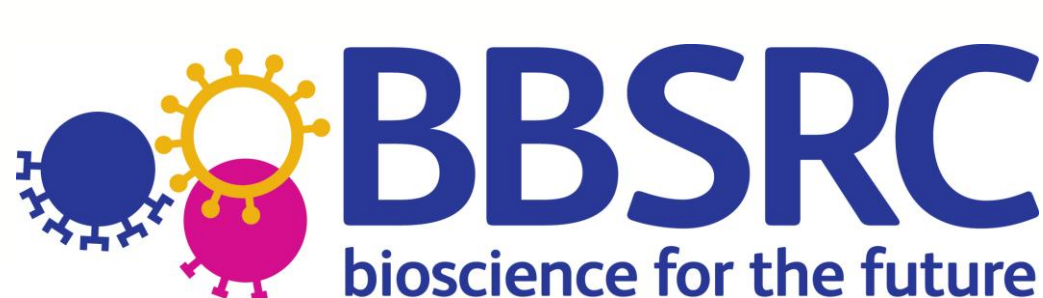
An Aurantiactinomyxon-type myxosporean was found infecting 6 of 672 oligochaetes, as determined by actinospore release. All of these worms were co-infected with a hyperparasitic microsporidian. This parasite infected the binucleate stages* of the myxosporean. At 7 days post-sorting all worms were releasing large quantities of actinospores, but the microsporidian infection was progressive, eventually stopping all actinospore release in the worms by 28 days post-sorting.



Myxosporean binucleate stages infected with microsporidian meronts (M)

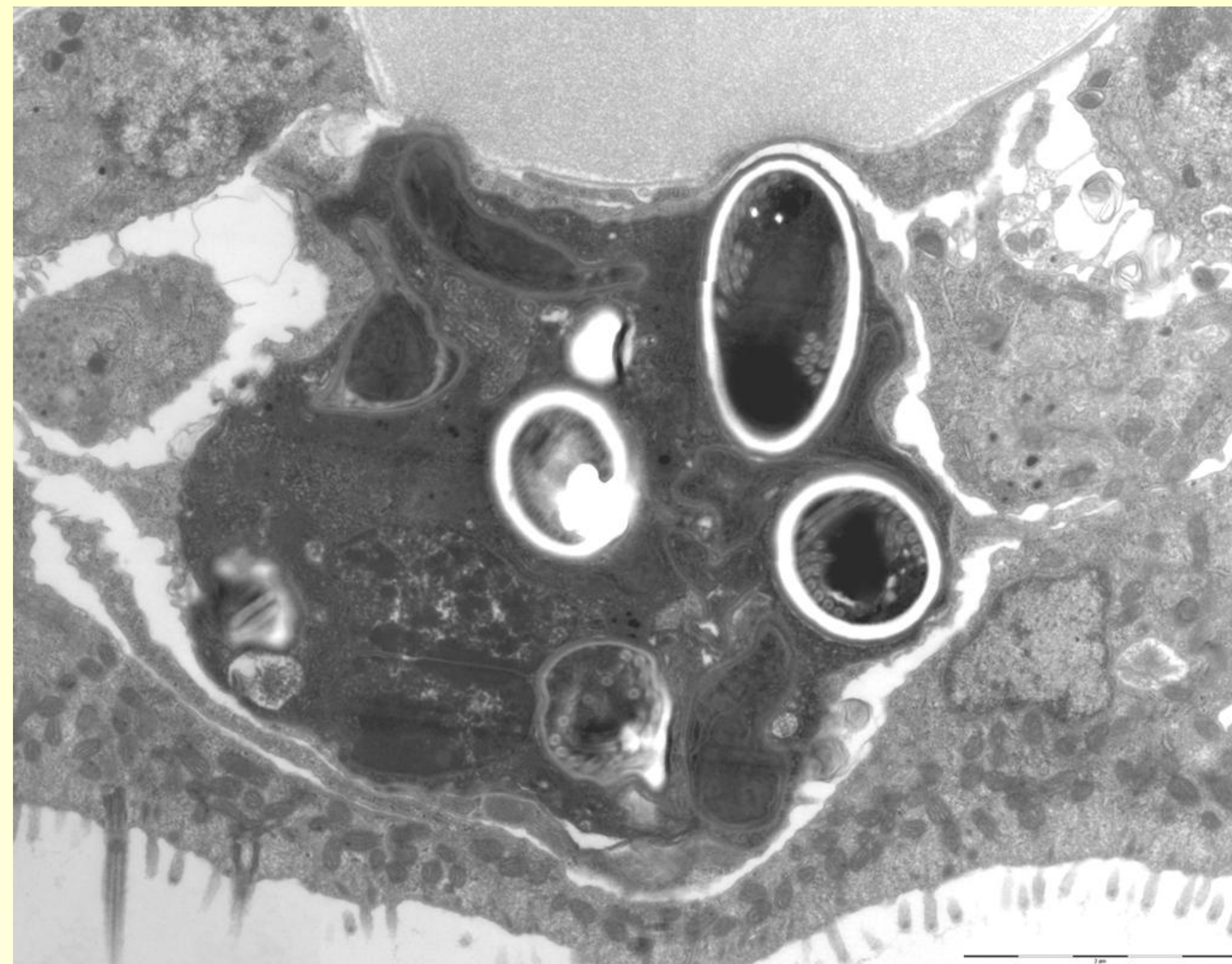
*see poster 83

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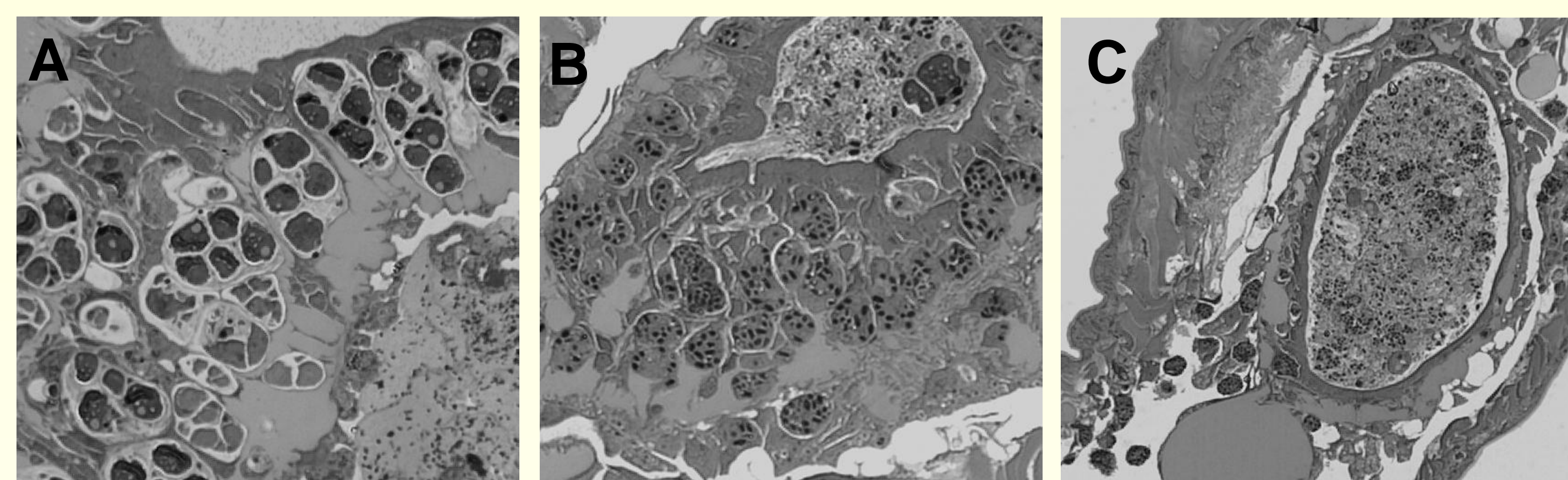


Acknowledgement

Thanks to Linton Brown for sample preparation.



Infected binucleate stage containing mature spores migrating through tissue to lumen of intestine.



Progression of infection post-sorting

- A) 7 days - many developing actinospores present
- B) 14 days - most myxosporeans infected with microsporidian
- C) 28 days - no actinospore production

Conclusions:

At least one microsporidian exists that hyperparasitises myxosporeans within oligochaetes. This infection reduces and stops actinospore development.

Current myxosporean study techniques, which pool oligochaetes and/or monitor actinospore release, could be compromised. Especially if confounding infections have a direct life cycle.

Literature reports on instances of

- Sudden actinospore cessation.
- Microsporidian-like 'schizogonic' stages present in samples.
- Difficulty replicating transmission studies
- Myxosporean 'susceptible' *Tubifex* becoming 'resistant' after exposure to 'resistant' lineages.
- Large spatial/temporal shifts in actinospore production

All of these results can be explained by confounding infections such as the microsporidian reported here.

Reference:

Janiszewska, J. (1957) *Zoologica Poloniae*. 8. 3-34.