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Some Coelozoic Myxosporida from New Zealand Fishes II. on a New Genus of Myxosporida, *Auerbachia*¹

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Abstract. *Auerbachia*, a new genus of Myxosporida, is characterized. Two new species, belonging to this genus, are described. *Auerbachia anomala* n. sp. is reported from the gall bladder of *Genypterus blacodes*, and *Auerbachia monstrosa* n. sp. from the gall bladder of *Coelorhynchus australis*. All infected hosts were taken by trawler working out of Wellington, New Zealand.

During a year spent at Victoria University, Wellington, New Zealand, under the auspices of the U. S. Educational Foundation in New Zealand, a number of New Zealand fishes were examined for evidences of infection with Myxosporida. A detailed report of the methods used and the treatment of materials has been given in a previous publication (Meglitsch, 1960). It will suffice here to state that the same methods were used for the preparation of permanent and temporary mounts, and that all measurements were taken from fresh specimens with the aid of a camera lucida.

Auerbachia anomala, gen. and sp. nov.
(Figures 1-4)

A total of four *Genypterus blacodes* were found to harbor spores of a myxosporidan that could not be assigned to any of the existing genera. The hosts were taken by trawlers working out of Wellington, New Zealand, between Noyember and May. The host animals were dead at the time of examination, and remnants of vegetative forms could not be adequately characterized. The spores, however, appeared to be in good condition. No abnormalities were seen in infected gall bladders, but as the host animals had been dead for some hours before being studied, only a very marked irritation could have been observed.

Vegetative Form. Remnants of the vegetative form were seen in only one of the infected hosts. Two very large, flattened trophozoites were present, both containing mature and developing spores. Both had been dead for some time, and were not in a state worthy of sectioning and staining. Evidence of a distinct endoplasmic region could be noted in the fragments; the developing and mature spores appeared to center in this grossly vacuolated region. The ectoplasmic region was relatively thick and appeared to have a large number of hair-like processes,

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similar to those Davis (1917) described in trophozoites of *Myxidium phyllium*. The largest trophozoite was approximately 4 by 2 mm. in size.

Spores. In one host, only a few spores were seen. In the rest, however, a large number of spores were present, floating in the bile. The spores were slightly flattened, and normally oriented themselves with the flattened plane parallel to the microscope slide. In this view, the spore consisted of a broadly oval, rather inflated anterior part, which narrowed sharply a few micra posterior to the end of the polar capsule and curved abruptly to one side. It continued as a caudal prolongation ending in a broadly rounded tip. In some spores the caudal prolongation was gently curved; in others it was nearly straight, and in a few it was slightly recurved toward its tip. The cavity of the spore continued without interruption into the caudal extension.

The spore membrane was relatively thin, both in the main body of the spore and in the caudal extension. No sutural ridge could be seen. In a few spores, evidences of what may have been a sutural line were seen along one side of the spore only, as though the spore membrane were composed of a single piece which was curved around the spore cavity and sealed on one side only. Repeated attempts to see this clearly failed, however, and the exact description of the spore membrane must await further studies, preferably on fresh, properly fixed sectioned material. In a number of spores a small nipple-like prominence was present at the site of the capsular foramen.

Each spore contained a single, large polar capsule, opening at a foramen at or near the anterior end of the spore. The prominent polar filament was coiled longitudinally, reminiscent of the coiling of the polar filaments of *Sphaeromyxa*. In some spores, a body interpreted as a persistent capsulogenous nucleus could be seen, but in most spores no remnant of the capsulogenous nucleus was observed.

The sporoplasm, about the same size as the polar capsule, was located somewhat posterior and lateral to the polar capsule in an asymmetrical position. It was rather coarsely granular, and contained two nuclei in the majority of spores. A single nucleus was present in a few. No evidence of an indinophile vacuole was seen.

The polar capsule and sporoplasm occupied but a relatively small part of the spore cavity. In a few cases, the sporoplasm extended part way into the caudal extension of the spore, but in most it was arranged in the main body of the spore. Small refractive spherules of material that appeared white-rimmed in bright phase illumination were present in the otherwise empty part of the main spore cavity, and in the cavity of the caudal extension.

Dimensions of fresh spores were: total length (measured from the anterior tip to the end of the caudal extension), 20.7-24.3 (22.4) μ ; length of the main body of the spore, 11.3-14.1 (13.4) μ ; length of

caudal extension, 9.0-10.7 (10.1) μ ; spore breadth, measured at the widest part, 7.8-9.0 (8.8) μ ; spore thickness, measured in the plane of spore curvature, about 4.5 μ ; polar capsules, 8.4-10.7 (9.5) μ by 2.8-3.4 (3.1) μ .

Discussion. No other myxosporidian spores like these have been reported, insofar as the writer knows. The caudal prolongation of the spore is reminiscent of the tails of *Henneguya* or *Myxobilatus*, but in these two genera, the two shell-valves meet in a prominent suture, and each shell-valve is prolonged to make a bifurcated tail, sometimes partly fused into a single process. *Unicauda* is equipped with an undivided caudal process, but in this genus the process is distinctly set off from the main body of the spore, consisting of a discrete piece. In none of these genera does the spore cavity continue into the caudal process. Furthermore, all have a sporoplasm with an iodophile vacuole.

A few genera, *Thelohanellus*, *Coccomyxa*, and *Unicapsula*, have a single polar capsule. None of these have other spore characteristics similar to the present form. *Phlogospora* described by Qadri (1962), however, forms spores equipped with a single polar capsule and with some similarities. The shell is thought to be composed of a single piece, and the large polar capsule is cylindrical, with a more or less independent neck. A caudal process is present, but it is normally bifurcated, and is said to be independent, fitting to the posterior end of the spore proper. The sporoplasm contains an iodophile vacuole. Furthermore, there is no indication of a longitudinally coiled polar filament.

For these reasons, the present species is thought to belong to a new genus, for which the name *Auerbachia*, in memory of Auerbach, who was so active in the study of Myxosporida in the first part of the century, is proposed. The genus may be characterized in the following manner:

Spore with a single polar capsule containing a longitudinally coiled filament and apparently covered with a membrane composed of a single piece. The posterior part of the spore is extended as a hollow process, the cavity being continuous with the spore cavity. Sporoplasm without an iodophile vacuole. Coelozoic.

Auerbachia anomala is designated as the type species.

Auerbachia monstrosa sp. nov.

(Figures 5-7)

In two *Coelorhynchus australis*, taken by trawlers working out of Wellington, New Zealand, *Auerbachia* spores were found floating in the bile. The hosts were taken in November and February.

Vegetative Form. Unknown.

Spores. The spores were shaped like those reported for *Auerbachia anomala*, with a broadly oval main spore body and a curved caudal

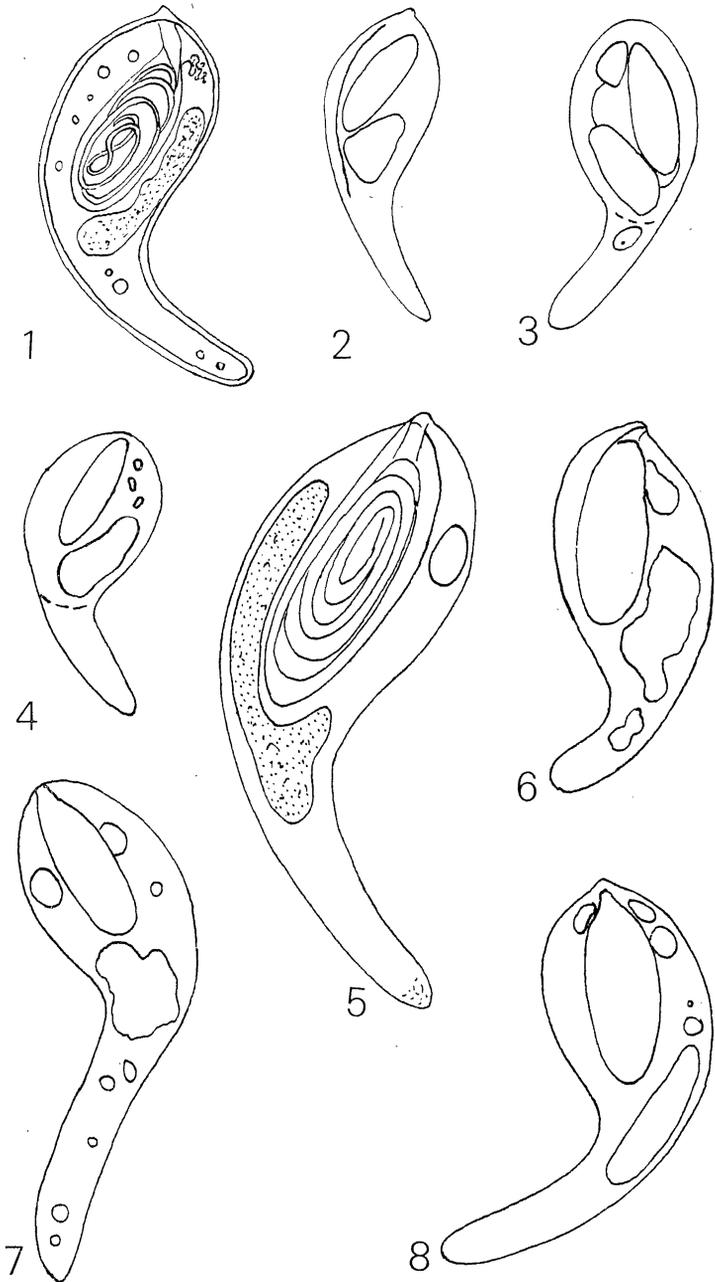


Figure 1. Spore of *Auerbachia anomala*, x. 2100. Figures 2-4. Outlines of representative spores of *Auerbachia anomala*, x. 1775. Figure 5. Spore of *Auerbachia monstrosa*, x. 2750. Figures 6-8. Outlines of representative spores of *Auerbachia monstrosa*, x. 2100.

prolongation whose cavity was continuous with that of the spore proper. The long, almost cylindrical polar capsule tended to taper slightly toward the anterior end, and no prominence was noted at the capsular foramen. The sporoplasm was binucleate, and somewhat larger than the sporoplasm in *Auerbachia anomala*, not uncommonly extending well into the caudal prolongation of the spore. No iodophile vacuole could be seen.

Dimensions: total length, 21.1-28.9 (25.2) μ ; length of main spore body, 12.2-16.7 (14.6) μ ; length of caudal prolongation, 9.8-15.7 (12.2) μ ; spore breadth, 9.3-10.3 (9.5) μ ; polar capsules, 9.8-13.2 (11.2) μ by 3.9-4.9 (4.3) μ .

Discussion. This species is quite similar to *Auerbachia anomala* in general appearance and size. The spore is slightly broader, and slightly more curved, with a caudal part that is somewhat narrower. The polar capsule is considerably larger. On the basis of these differences, it is concluded tentatively that it is a distinct species, and the name *Auerbachia monstrosa* is proposed for it.

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