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Ultrastructural characterization, pathogenicity and host parasite relationship of microsporidian parasites infecting some marine fishes of the Red Sea, Egypt

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Fish represent one of the most important sources of high-quality protein essential for human feeding. They provide about 16% of the animal protein consumed by the world's population, according to the Food and Agriculture Organisation (FAO) of the United Nations. Parasitic infection is one of the most important problems facing fish production especially in the development of aquaculture. Among them, phylum Microsporidia constitutes the obligate intracellular protozoan parasites that contribute to mortality in fishes. In the infected cells, these parasites may either cause serious degradation of the cytoplasm and admise of the cell or they may elicit host cell hypertrophy. These produce a parasite hypertrophic host cell complex, the xenoma. It is quite clear that the electron microscopy is the gold standard for identifying specific species and diagnosing microsporidiosis and allows the understanding of their life cycle stages and their pathogenicity. In the present study 600 marine fish from the Red Sea in Egypt belonging to three different species were collected and examined for microsporidian parasites infection. Seventy eight fish specimens with a percentage of 14.5 were found to be infected. Regarding host parasite relationship, both parasite and host seem to benefit from the xenoma formation, the first offered an optimal growth conditions protecting it against host attack. The host benefits by confining the parasite to several or many infected cells to limit the free spread of the parasite. Xenomas were recovered, ruptured and the liberated spores were examined by photo research Zeiss light microscope. Each spore was elongated to ellipsoidal in shape and possessed a posterior vacuole which is characteristic to phylum Microspora. At the same time, materials were prepared in the usual way for transmission electron microscopic study. Ultrastructural microscopic study showed the presence of smooth membranes of the sarcoplasmic reticulum forming a thick, amorphous coat surrounding various developmental stages of the parasite. These were uninuclear, binucleated, and multinucleated meronts followed by detachment of the plasmalemma of the sporont from the sporophorous vesicle producing sporoblasts. Mature spores consist of a spore coat and spore contents. Ultrastructure characteristic organelles of the examined spores including uninucleated sporoplasm and a posterior vacuole located at the posterior end revealed that these different species are belonging to the genus *Pleistophora*. The polar tube consists of a straight shaft and a coiled region which was 20-26 coils for the type isolated from *Saurida tumbil*, 8-10 for *Pagrus pagrus* and 28-32 coils for *Epinephelus chlorostigma* arranged in many rows along the inside periphery of the spore. The polaroplast consisted of an anterior region of closely and loosely packed membranes. This study indicated that the parasites examined are belonging to three different species of the genus *Pleistophora*.

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