

# *Ceratomyxa* spp. (Myxosporea) infection in cultured shi drum (*Umbrina cirrosa*) and cultured brown meagre (*Sciaena umbra*) from Greece

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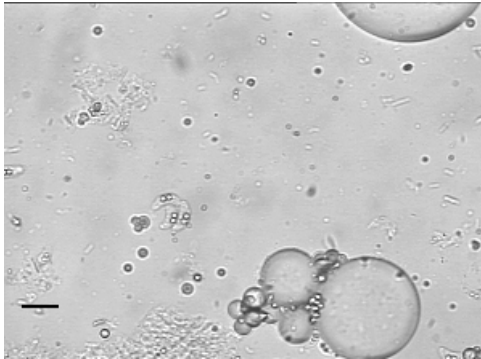
## Abstract

This is the first report of *Ceratomyxa* spp infection in cultured shi drum (*Umbrina cirrosa*) and cultured brown meagre (*Sciaena umbra*). Spores of *Ceratomyxa* spp. were found in fresh smears from gall bladder and gut. The histological examination revealed lesions in the intestine, kidney and liver of the infected fish. No mortalities were recorded in the farm due to these parasites, but it is believed that the parasites delayed the growth of the infected fish.

Shi drum (*Umbrina cirrosa*) and brown meagre (*Sciaena umbra*), family Sciaenidae, are marine species that are cultured on a small scale in Greece and other Mediterranean countries. They are considered good alternatives to sea-bream (*Sparus aurata*) and seabass (*Dicentrarchus labrax*) farming, mainly due to their good survival and growth rate under culture conditions (Francescon et al., 1997; Mylonas et al., 2000; Papandroulakis et al. 2003). However, little is known about the pathological conditions that can manifest in these species, especially the ones related to various pathogens that affect the other more popular species, such as seabream and seabass. *Ceratomyxa* spp. infections are generally considered relatively harmless, possibly delaying the growth of the fish (Rigos et al., 1997). This study describes a case of *Ceratomyxa* spp. infection in cultured shi drum and brown meagre.

In the beginning of April 2005, twelve apparently healthy shi drums, weighing approximately 20 gr and eight brown meagre, weighing approximately 100 gr were randomly captured, killed and sent on ice to the Hellenic Centre for Marine Research, Athens, Greece, following a routine monitoring regime. The water temperature at the site of sampling was approximately 18° C and the salinity 38 ‰. Fresh smears from gills, gall bladder and gut were prepared and observed using a light microscope. Tissue samples were also collected and fixed in 10% buffered formalin for histological examination. All examinations were carried out according to the methods described by Roberts (1989). Externally, no gross lesions were observed. Internally, the gall bladder in some fish appeared swollen and the bile was dark green. The parasitological examination of fresh smears from the gills was negative, while

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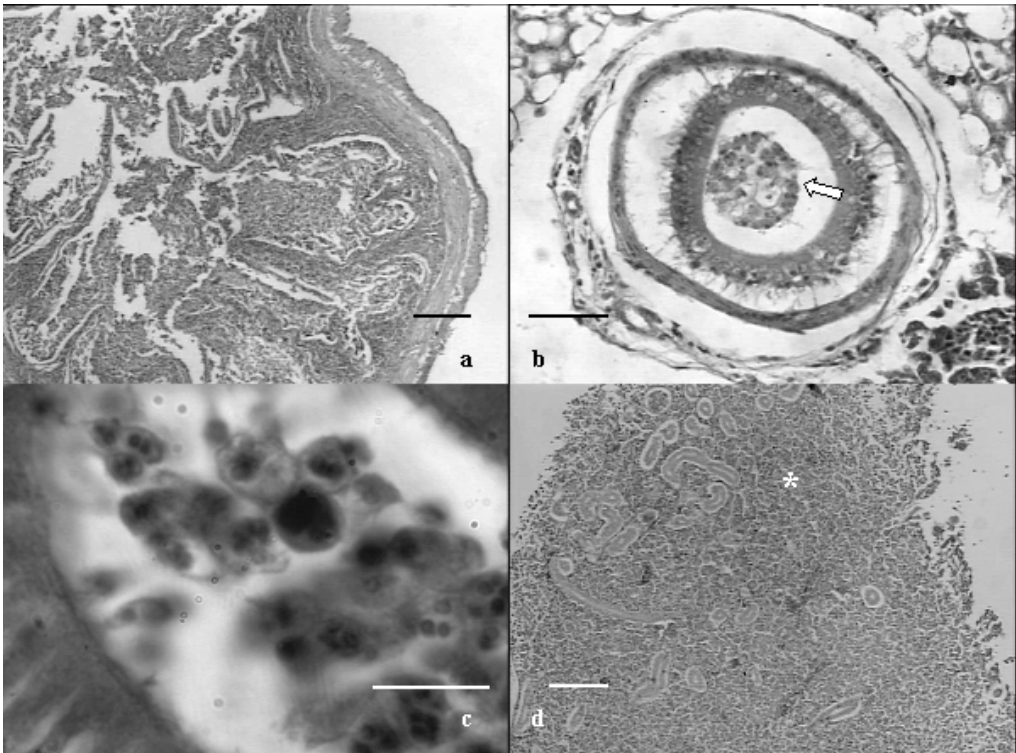
**Figure 1.** *Ceratomyxa* spp spores in fresh smears of gall bladder from infected shi drum. Bar= 20  $\mu$ m.

smears from the gall bladder revealed the presence of *Ceratomyxa* spp. spores in eight of the brown meagre and four of the shi drum (Figure 1). In five of the infected fish (three brown meagre and two shi drum), the numbers of the spores per examination area were high. In the same fish, spores, to a lesser extent, were also found in smears from the gut. Histological examination of tissue samples revealed lesions in the kidneys, livers and intestine of the infected fish. In particular, there was extensive sloughing of intestinal mucosa and infiltration of immune cells of the gut wall (Figure 2a). In the liver, there was heavy fatty infiltration of the hepatocytes, followed by focal necrosis, especially in older fish. There was also thickening of the walls of the bile ducts, the lumen of which were filled with various developmental stages of *Ceratomyxa* spp (Figure 2b). In the kidney, tubular degeneration and pyknotic epithelial cells were observed, and developmental stages of *Ceratomyxa* spp. were seen in the lumen of the tubules (Figure 2c). Especially in the infected brown meagre, the histological findings were more pronounced and there

was hyperplasia of the interstitial haemopoietic tissue in the trunk kidney (Figure 2d).

In other fish species, such as seabass, seabream, sharpnose sea bream (*Diplodus puntazzo*) and common dentex (*Dentex dentex*) *Ceratomyxa* spp. infections are considered to have a negative effect on the growth of the fish, since the parasites can affect the digestive function (Fioravanti et al., 2001; Rigos et al., 1997). In the present study, the histological findings pointed in the same direction. They were in agreement with the ones described by other authors for *Ceratomyxa shasta* in salmonid fish (Alvarez-Pelitero & Sitja-Bobadilla 1993). It should be noted that no developmental stages of *Ceratomyxa* spp. could be seen within the layers of the intestine. However, it is believed that the parasites were responsible for the damage, since no enteritis was observed in the fish, which were not infected by *Ceratomyxa* spp. It is not clear whether the hyperplasia of the interstitial haemopoietic tissue observed in the kidney of the infected brown meagre had been developed due to different reaction of the species to the parasite or because the brown meagre were older (mean weight 100 gr), compared to the shi drum (mean weight 20 gr) and thus had the time to develop the reaction.

No mortalities were recorded at the time of the sampling, but the histological picture of the infected fish suggested that the fish had reduced ability to utilize the feed (obstructed bile ducts, enteritis), and thus retarded growth. In addition, the extensive enteritis could potentially cause osmoregulation dysfunction, as has been also suggested by



**Figure 2.** Tissue sections from shi drum infected with *Ceratomyxa* spp.  
 a) Severe enteritis, sloughing of the intestinal epithelium. Bar = 200  $\mu$ m.  
 b) Bile duct filled with developmental stages of *Ceratomyxa* spp. (arrow). Bar = 100  $\mu$ m.  
 c) Kidney tubule containing developmental stages of *Ceratomyxa* spp. Bar = 20  $\mu$ m.  
 d) Hyperplasia of the interstitial haemopoietic tissue (\*) Bar = 200  $\mu$ m.

Gbankoto, Pampoulie, Marques, Sakiti, and Dramane (2003), for another myxosporean parasite, *Myxobolus heterospora*, which caused extensive intestinal destruction in two tilapia species *Sarotherodon melanotheron melanotheron* and *Tilapia zillii*.

The culture of shi drum and brown meagre is still in a very early stage. Our knowledge on many aspects of their culture, such as nutritional and environmental requirements is currently limited. Additional research is also required on the various pathogens that can affect these two species.

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