Mass mortality of young striped jack *Pseudocaranx dentex* caused by a fungus *Ochroconis humicola*

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**ABSTRACT**—In April 2004, a fungal infection occurred in cultured young striped jack *Pseudocaranx dentex* at a fish farm in Ehime Prefecture, Japan. The cumulative mortality reached about 25% in one month after the disease was first recognized. Moribund fish showed disease signs such as abdominal swelling and distended kidney. A fungus was purely isolated from the kidney of the fish using PYGS agar. The colony was pale brown in color, and the conidia were two-celled, cylindrical to oblong with rounded ends and smooth-walled. From these morphological characteristics, the fungus was identified as *Ochroconis humicola*. This infection of marine fishes has been reported in the skin of juvenile fish, but not known in young fish. This paper describes the first case of *O. humicola* infection in visceral organs of young striped jack.

**Key words:** *Ochroconis humicola*, *Pseudocaranx dentex*, striped jack, fungal infection

The fungal infection in fishes caused by *Ochroconis humicola* was first reported from the kidney of coho salmon *Oncorhynchus kisutch* (Ross and Yasutake, 1973). Later, *O. humicola* infection were reported from rainbow trout *Salmo gairdneri* (Ajello et al., 1977), Atlantic salmon *Salmo salar* (Schaumann and Priebe, 1994), devil stinger *Inimicus japonicus* (Wada et al., 1995), barramundi cod *Cromileptes altivelis* (Bowater et al., 2003), red sea bream *Pagrus major* and marbled rockfish *Sebastiscus marmoratus* (Wada et al., 2005). This paper describes the first case of *O. humicola* infection in striped jack *Pseudocaranx dentex* in Japan.

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A fungus was purely isolated from infected fish. As all isolates were judged as the same fungus, an isolate NJM 0472 was randomly selected among the isolates and used for all experiments in this study. Colony of the isolate showed dark brown to black color when observed from the reverse side of the plate and no visible exudates diffused into the medium, and it was flat, very slow-growing on PDA plate. Colony radii on PDA incubated at 25°C reached 30.1 mm after four weeks. Hyphae were septate, 2 to 3 μm in diameter, pale brown in color, and aerial hyphae were sparse. Conidiophores were predominantly cylindrical, average 2.5 × 7.5 μm and had denticles at each tip. Conidia were holoblastic, two-celled, cylindrical to oblong with rounded ends, average 2.5–4.5 × 5.5–12.5 μm, smooth-walled, and pale brown in color (Fig. 3). The isolate was identified as *Ochroconis humicola* from these characteristics.

**Effect of temperature on growth**

Colony radii of the isolate NJM 0472 incubated on PDA at 10, 15, 20, 25 and 30°C were 1.4, 10.5, 21.5, 30.0 and 26.3 mm, respectively. No fungal growth was observed at 35°C.

**Effect of NaCl concentrations on growth**

Colony radii of the isolate NJM 0472 incubated on PDA including 0, 1, 3, 5, 7, 9 and 11% NaCl were 30.0, 33.4, 34.1, 27.9, 15.5, 7.2 and 0 mm, respectively. The fungus grew well on PDA containing 3% NaCl.

**Histopathological observations**

Fungal hyphae were found in the musculature (Fig. 4A), spleen (Fig. 4B) and kidney. Granulomas encapsulating hyphae were observed in the spleen (Fig. 4C) and kidney (Fig. 4D). The granulomas consisted of massive fungal elements and outer layers surrounded by epitheloid cells. No bacteria or parasites were histopathologically found in the examined tissues.

**Discussion**

The genus *Ochroconis* belongs to the dematiaceous fungi, which are characterized by the presence of melanin compound within the cell wall of hyphae or spores (Schell, 2003). Therefore, the color of colony looks like brown to black. *Ochroconis humicola* (formerly named *Scolecosbasidium humicola*) has been reported in salmonids (Ross and Yasutake, 1973; Schaumann and Priebe, 1994; Ajello et al., 1977), later marine fishes (Wada et al., 1995; Bowater et al., 2003; Wada et al., 2005), and also in tortoise (Weitzman et al., 1985).
Ochroconis humicola infection was found in a wild-caught barramundi cod in Australia (Bowater et al., 2003). The size was not described, but it was matured fish, not young. Up to the present O. humicola infection in cultured marine fishes in Japan has been found only in the skin of juvenile, namely 1.4 g devil stinger Inimicus japonicus (Wada et al., 1995) and 1.2 g red sea bream Pagrus major and 1.0 g marbled rockfish Sebastiscus marmoratus (Wada et al., 2005), but not in young stage more than 5 g in body weight. Furthermore, many striped jack died due to the infection in the present case. Namely, O. humicola infection in young striped jack accompanied with mass mortality is the first case.

The isolate grew at 10 to 30°C, but not at 35°C. The results were corresponded with Horré et al. (1999) who reported that O. humicola isolated from brain of fish did not grow at 35°C. The isolate NJM 0472 could grow up to 9% NaCl indicating that O. humicola could grow in an environment with a wide range of salinity.

Histopathological findings of naturally infected fish were almost similar to the results of previous reports on O. humicola in fishes (Ross and Yasutake, 1973; Ajello et al., 1977; Wada et al., 1995; Bowater et al., 2003; Wada et al., 2005). The diagnosis of the infection caused by phaeohyphomycosis, which is an infection caused by dematiaceous fungi, is relatively easy, because the presence of brown pigmented fungal elements in tissues is histopathologically demonstrated (Carter and Chengappa, 1991).

References