

BACTERIA OF THE GENUS *VIBRIO* ISOLATED FROM WILD DISEASED FISH IN GREECE

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Abstract

The presence of different species of *Vibrio* isolated from wild diseased marine fish was investigated. *Photobacterium damsela* subsp. *damsela* (previous *Vibrio damsela*) was isolated and identified from the fish species *Boops boops*, *Pagellus erythrinus*, *Lisa aurata* and *Conger conger*. In addition, *Vibrio ordalii* was isolated from *Serranus scriba* and *Vibrio splendidus* was isolated from *Diplodus annularis*. These *Vibrio* species are pathogens of farmed fish as *Sparus aurata*, *Dicentrarchus labrax* and *Puntazzo puntazzo*. Interestingly, there were no reports of simultaneous infection of the local farmed fish by the same pathogens. It is suggested that the infected wild fish could act as reservoir for these bacteria.

Keywords: *Vibrio*, diseases, wild marine fish, farmed fish, reservoir

Introduction

Several species of the genus *Vibrio* cause diseases in marine fish populations, both wild and cultured (1). *Vibrio* species are gram-negative, halophilic, non-spore-forming bacteria and autochthonous inhabitants of the marine environment. It is still debatable whether these bacteria behave as opportunistic or obligatory fish pathogens in marine environments. Susceptibility to *Vibrio* infections is related to several environmental and other factors, which cause stress to fish (2).

Photobacterium damsela subsp. *damsela* (previously named *Vibrio damsela*) causes skin ulcers or systemic disease in a wide range of fish, including blacksmith damselfish, yellowtail, turbot, gilthead sea bream, and brown shark (3).

Vibrio ordalii is one of the major causes of vibriosis in wild and cultured marine salmonids in Japan and the Pacific Northwest of the United States (4). This bacterium causes a bacterial hemorrhagic septicemia. In addition, bacterial microcolonies are formed in muscle, gill and gastrointestinal tract (5).

Vibrio splendidus has been isolated from cultured turbot in Spain, Atlantic salmon in Scotland, turbot and European sea bass in Norway (6, 7). It causes a typical bacterial septicemia. In Greece it was reported for the first time in sea bass and red porgy (8).

In this study we report six different cases of diseased wild fish, which were examined in the fish pathology laboratory of National Center for Marine Research. Diagnosis was based on the clinical appearance of the disease and the laboratory isolation and identification of the bacterium.

Materials and Methods

During the period of 1997-2001, samples of diseased wild fish (*Lisa aurata*, *Mugil cephalus*, *Pagellus erythrinus*, *Serranus scriba*, *Diplodus annularis* and *Boops boops*) from different regions of Greece were tested bacteriologically. Bacterial isolation was made from the head kidney. Specimens were cultured in tryptone soy broth, tryptone soy agar and Cholera medium (CBS (code CM333 OXOID), all supplemented with 2% NaCl at 22° C for 24-48h. After incubating the plates at 22° C for 24-48 h the isolated pure colonies that appeared were used for the identification of the bacteria. The identification was done employing standard morphological and biochemical procedures and the Api 20E (Biomerieux) identification system according to Alsina & Blank (9).

Results and Discussion

Vibriosis are facultive pathogens, which can affect marine fish causing serious pathological conditions known as vibriosis. All marine fish are probably susceptible to at least one species of *Vibrio* (10). The fish species that were examined and found infected with vibrios were *Lisa aurata*, *Mugil cephalus*, *Pagellus erythrinus*, *Serranus scriba*, *Diplodus annularis* and *Boops boops* (Table 1). It is the first time that these fish species were found infected with these *Vibrio* species in Greece. All fish examined exhibited external skin lesions (hemorrhages and skin ulcers) Most of the fishes that were found to be infected with *Ph. damsela* subsp. *damsela* also had fluid in the peritoneal cavity (ascites).

Although in most cases of vibriosis, cultured fish are mainly affected, in the present study no simultaneous infection of cultured fish in the same area was reported. It is possible, however, that there are disease interactions between wild and cultured fish, since the water and the wild fish can act as reservoir for these pathogens. The horizontal transmission through water of the disease, caused by the fish pathogen *Photobacterium damsela* subsp. *damsela*, as well as

the role of the skin mucus in the initial steps of the infection have also been studied by Fouz *et al* (11).

This is the first report of vibriosis caused by vibrios other than *V. anguillarum* in wild fish of Greece. There is need for further investigation about the exact way of transmission of these bacteria from wild to cultured fish or the opposite, through water and sediment.

Table 1. Bacteria of the genus *Vibrio*, isolated from wild diseased fish.

Species of diseased wild fish/Case	Species of isolated bacterial pathogen	Date/Place
<i>Boops boops</i> (5 fish)	<i>Photobacterium damsela</i> subsp. <i>damsela</i>	Island of Paros, 2001
<i>Pagellus erythrinus</i> (3 fish)	<i>Photobacterium damsela</i> subsp. <i>damsela</i>	1999
<i>Mugil cephalus</i> , <i>Lisa aurata</i> (4 fish)	<i>Photobacterium damsela</i> subsp. <i>damsela</i>	Araxos area, 1997 Pagasiticos gulf, May 1999
<i>Conger conger</i> (1 fish)	<i>Photobacterium damsela</i> subsp. <i>damsela</i>	Peloponnisos, 2001
<i>Serranus scriba</i> (2 fish)	<i>Vibrio ordalii</i>	Pagasiticos gulf, May 1999
<i>Diplodus annularis</i> (1 fish)	<i>Vibrio splendidus</i>	Pagasiticos gulf, May 1999
Sea water from a mussels aqua farm	<i>Photobacterium damsela</i> subsp. <i>damsela</i>	Thermaikos gulf, 2000

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