ORIGINAL ARTICLE

Bacterial flora of Sturgeon fingerling

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ABSTRACT

The study on microbial populations is a suitable tool to understand and apply control methods to improve the sanitary level of production in fish breeding and rearing centers, ensure health of sturgeon fingerlings at the time of their release into the rivers& also in the conversation and restoration of these valuable stocks in the Caspian Sea, Iran. A laboratory research based on Austin methods (Austin, B., Austin, D.A. 1993) was conducted for bacterial study on 3 sturgeon species naming A. persicus, A. stellatus& A. nudiventris during different growth stages.Bacterial flora of Acinetobacter , Moraxella, Aeromonas, Vibrio, Edwardsiella, Staphylococcus, Proteus, Yersinia, Pseudomonas and Plesiomonas were determined. The factors which may induce changes in bacterial populations during different stages of life are the followings: quality of water in rearing ponds, different conditions for growth stages, suitable time for colonization of bacterial flora in rearing pond, water temperature increase in fingerlings size& feeding condition.

Key words: Acipenser, bacterial flora, fingerling

INTRODUCTION

The sturgeon survival issue in the Caspian Sea has been the subject of numerous popular and scientific articles that cannot be cited here. For example till 1976 only 7 articles were published strictly on Iranian fishes, but in 2006 they reached to over 160 articles. (http://www.briancoad.com)

Although the study of fishes is a very active field within Iran and the Middle East, but there is a gap on investigating the density of microbial populations and to assess if some microorganisms can continue to live in marine water in the stages after releasing of fingerlings in sea.

As mentioned above, Iran has started rearing& propagation of sturgeon to conserve their stocks from several years ago. Considering the economic value of sturgeons as a strategic product and investing high capitals or rehabilitation have special importance and must be considered. In order to identify& isolate bacterial populations in different sturgeon fingerlings (*Acipenser stellatus, A. persicus& Huso huso*) and vaccination of fingerlings before releasing in the sea, the most dominant bacterial populations should be determined and also bacterial antigens of dominant bacteria species which are more pathogenic should be applied.

In this study complete and valuable information to identify various bacterial diseases which may occur in propagation and rearing of fingerlings can be obtained. The objective of the research is to investigate bacterial flora in *A. persicus, A. stellatus* and *Huso huso* in the mid and end of rearing period in earthen ponds, also various species of fingerlings compared in terms of variety of bacterial flora. This information is valuable to inform us on density of microbial populations and to assess if some microorganisms can continue to live in marine water in the stages after releasing of fingerlings in sea.

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METHODOLOGY

This study was conducted in Gilan province, Iran, in 2007. First the fingerlings washed by distilled water, and then sampling of gill and skin carried out. Then samples transferred to culture medium containing TSA (triptic soy agar) & inoculated by liner culture. After incubation of culture plates in 20-25 centigrade degree for 24-72 hours, the bacterial colonies were purified at first, then after ensuring the purity of these colonies (preparing smear and gram staining).

The secondary passages were used for performing biochemical experiments such as oxidase test, urease production, methyl red test and voges-proskauer reaction, acid production from different sugars, indole production, production of hydrogen sulphide, motility test, reduction nitrate, production of arginine dihydrolase and lysine decarboxylase, oxidation-fermentation test, metabolism by Austin methods (Austin, B., Austin, D.A. 1993).

RESULTS

In this study, the mean percent frequency of bacterial flora in sturgeon fingerlings were Acinetobacter (12.70 ±1.90& 15.59 ±8.92), Moraxella (12.31± 3.53& 1.82± 0.42), Aeromonas (8.77± 6.50&5.19± 2.94),

Vibrio (2.24±0.29& 2.63±2.27), Edwardsiella (8.65±6.82& 3.29± 0.68), Staphylococcus (5.08± 2.29& 2.86± 0.60), Proteus (4.76± 3.35& 3.56±2.52), Yersinia (4.44± 2.50& 0.61±0.87), Pseudomonas (2.06±1.58& 1.39± 1.00), Plesiomonas (2.00±1.52&0) in the mid & end of rearing period, respectively. Diseases of sturgeon like other cartilagous and cartilagous- bony fish and bony fish can be divided into infectious and non-infectious group.

DISCUSSION

Infectious diseases may be created by bacteria, viruses, parasites and fungi that some of them has been shown in these sturgeons. Non- infecta diseases may occurred by different environmental and feeding factors or even genetic factors. Some of these diseases such as syndrome myopati which has caused considerable lost in northern parts of Caspian sea and Volga river has not been known yet. In different stages of rearing especially initial stages many diseases can be occurred by inadequate nutrition of fish, e.g. vitamin deficit, unbalance of dietary element, deficit in essential amino and fatty acids. The degree of intensity of disease depends on quality of food and rearing management. In the study performed on the bacterial flora of sturgeons in Volga river, the following bacteria were isolated: Aeromonas, Acinetobacter, Acaligenes, Citrobacter, Enterobacter, Moraxella, Morganella, Micrococcus, Flavobacterium, Escherichia, Pseuodomonas, Proteus, Providencia, Salmonella, Hafnia (Lartseva, 1992). Study on Acipenser baeri showed that this species in very sensitive to Yersinia ruckeri, Vibrio anguillarum and Flexibacter columnaris (Brun et al., 1991). In white sturgeon (A. transmentanous) these diseases have been reported Myxobacteriosis, Columonaris, Costia, External Fungus, Sturgeon Wasting Disease, Liver Disease and Inflammation of Intestine (Conte et al., 1988).

In addition, study on bacterial pollution of eggs showed many types of bacteria flora like Aeromonas, Vibrio, Pseuodomonas, Acinetobacter, Moraxella, Edwardsiella, Seratia, Citrobacter and Proteus (Shenavar, 2000). In investigation of flora bacteria in sturgeon larvae these bacteria were isolated: Aeromonas, Vibrio, Pseuodomonas, Moraxella, Acinetobacter, Edwardsiella (Shenavar, 2000). Also in international sturgeon research institute, A.persicus was immunized against Aeromonas hydrophila.

Condition of bacterial flora in fingerlings shows the density of this population in rearing ponds and through increase in density of some populations, we can forecast which disease can be appeared in the hatcheries. In this investigation, the main bacteria which isolated were primary pathogen and opportunistic group that can probably live in unfavorable condition like stress, feeding decrease, low level of oxygen, temperature instability, that create disease in different growth stages and may cause losses these two groups of bacteria were not completely separated. Virulence of these bacteria differs in various aquatic species which should be studied comprehensively in different fish species. Since increase in bacterial flora in rearing ponds can influence on growth rate and survival percent, then fish farms with high density of bacterial flora, leads to decrease in growth& survival percent.

According to the research, in this case of increase in microorganism's density, even non pathogenic, the bacteria can create stress in fish in different ways such as (decrease in oxygen level of water), the fishes cannot feed adequately and finally results in decreasing fish growth and lower resistance to pathogenic factors.

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