



ORIGINAL ARTICLE

Effect of Organic and Chemical Fertilizer on Fresh Water Fish Produces with Emphasis on Silver carp (*Hypophthalmichthys moltrix*) in Shoushtar area

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ABSTRACT

This study was carried out in two experiments to evaluate and determine the effect of different fertilizer applications (chemical fertilizer and organic fertilizer) Four ponds were carried out in this study, first experiment was designed with two ponds use just chemical fertilizer (urea 200kg/hect and phosphate 300 kg/hect) and The second experiment was designed two ponds use organic fertilizer and chemical fertilizer (urea 100kg/hect +phosphate150kg/hect +cattle manure 300kg/hect) to find out less mortality. Results of the first experiment showed that the produces was lower than second experiment and mortality too less than the second. In fish specimens that investigated about microbiology find out *Aeromonas hydrophila* in liver and kidney that The highest bacterial load was found in second experiment. As a conclusion for the present study we find out mortality in chemical fertilizer fish culture is lower than both of the fertilizer although decrease produces but in semi intensive culture is economic.

Keywords: organic and chemical fertilizer, *Aeromonas hydrophila*, silver carp

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INTRODUCTION

Warm water fish culture are included in more than 60 percent of the products of aquaculture. Among the fish aquaculture, Silver carp most species breeding. Due to lower cost of breeding this species. Unfortunately, during the years of recent losses, This fish farms has increased. This problem can be seen in the Khouzestan province in the summer. In different years, the mortality rate is variable, up to 25 percent.

In study of cause of fish death, researchers have noted a variety of different causes.

Some of the researchers on the role of environmental factors (physical and chemical parameters of water, fertilizing, high algal toxicity and nutritional factors (fish feeding Grass carp instead of Silver carp feed) have emphasized on mortality.

Algal bloom and major fertilization cause of high mortality in Guilan province in silver carp as possible[1]. All of the carp culture are originally Chinese breeding and rearing of this species is more common in East Asia. Further studies of this disease in China is like a viral disease known to be present in fish[2].

In other countries, like the carp deaths have been reported due to bacterial agents [3,4,5].

Chemical fertilizers are normally used to improve soil fertility and increase agricultural crop yields. In fish Ponds they stimulate Phytoplankton Production which increase fish yields. They contain inter filler material mixed with three important minerals, nitrogen(N), phosphorous (as P₂O₅) and potassium (as K₂O or potash) which are needed by Phytoplankton in fish ponds.

Fertilizers used in fish ponds are of two categories, inorganic and organic. The major fertilizing elements are nitrogen, phosphorus, potash and calcium whereas, the minor elements are manganese, boron, sulphur, iron, copper, zinc etc. The advantages of inorganic fertilizers are that they have a definite chemical composition of nutrient elements and are instantly soluble in water [6].

Aeromonas hydrophila and other aeromonads are among the most common bacteria in freshwater habitats throughout the world[7].

It seems that most of the organic material is sensitive bacterial fish diseases in aquaculture.

MATERIAL AND METHODS

This study was conducted during the summer months in 2013. Due to losses in warm water aquaculture in Khouzestan province (Shoushtar) the number of fish dying or symptoms were sampled. Bacterial cultures prepared from the kidneys, liver and spleen were them. Primary cultures of bacteria from internal organs (kidney, liver and spleen) in TSA medium containing 5 percent sheep blood was obtained. if the bacterial growth medium, purified and tested supplementary microbial Subtraction was performed in bacteriological laboratory.



Image1: Intestine infected in Silver carp

Image2: Silver carp

Each fish was brought to the laboratory immediately after death, dissected out, kidney was touched with a sterilized loop and streaked onto AIM (*Aeromonas* isolation medium) plates. The plates were incubated at 25C for 48 hours for *A. hydrophila* colony appearance[8]. Intestine, liver and kidney of each dead fish were dissected out aseptically and placed in sterilized separate plastic Petri dishes. After weighing, sample of each of the above organ was homogenized and suspended in sterile physiological saline (1 part of sample: 9 parts of PS) to obtain a stock solution. Two consecutive decimal dilutions, 10-1 and 10-2, from the stock solution were made for each organ. At first the dilutions (stock, 10-1 and 10-2) were used for spreading onto AIM plates to confirm *A. hydrophila*. Then the dilutions were used for spreading onto duplicate TSA plates and incubated at 25°C for 48 hours for colony appearance. Appeared colonies were counted by digital colony counter and all the data of bacterial colony counts were recorded for calculating bacterial load in different organs. The bacterial load was calculated by using the following formula after [4].

Water samples from each farm in sterile glass bottles 100ml wide mouth with screw cap rubber surface were collected from a depth of 50 cm.

Total count of bacteria was performed with Spread method or pure plate method. the total Vibrio count using specific media Vibrio (TCBS) by pure palate method was also performed.

Water parameters were analyzed once every three days for a number of different parameters. Temperature and pH were recorded using a Horiba water quality analyzer (Model U-10). Dissolved oxygen, total ammonia, nitrite and nitrate were measured following standard procedures [9].

RESULTS

Results showed that prevalence of *A. hydrophila* infection was higher in cultured fish during the summer season in organic fertilizer and chemical fertilizer culture than chemical fertilizer culture. The most common bacterial infection caused by *Aeromonas hydrophila* in fish has been isolated from 16 percent of the samples.

Table 1:Percent of infected fish samples with motile *Aeromonas*

Total fish sampled	Total bacteria isolated		<i>A. hydrophila</i>	
	percent	number	percent	number
87	19	17	16	14

Table 2: Morphological, physiological and biochemical characteristics *A. hydrophila* isolated from Silver carp in Khuzestan province

Characteristic	Result	Characteristic	Result		
Staining reaction	+	Lactose	+		
Motion	+	Methyl red	-		
Oxidase	+	TSI	+		
Catalase	+	O/F	+		
Indole	+	MacConkey agar	+		
Ornithin(ODC)	-	SH ₂	-		
Arbutin Hydrolase	+	Xylose	-		
Hydrolyze	Gelatin	+	Growth Temperature	4 °C	+
	Urea	-		37°C	+
	Scoline	+		42°C	+

Table 3: The internal organs of infected fish samples with motile *Aeromonas*

Silver Carp Fish Organs				
Intestine	Liver	Kidney	Gills	Skin
<i>A. hydrophila</i> <i>Proteus</i>	<i>A. hydrophila</i>	<i>A. hydrophila</i>	<i>A. hydrophila</i> <i>Entrobacter</i> <i>E. coli</i>	<i>Pasteurella sp.</i> <i>A. hydrophila</i>

DISCUSSION

Loss of silver carp in the aquaculture industry as one of the major health problems in recent decades has been a warm water fish. In all of Bacteriological studies, motile *Aeromonas* in these deaths have been reported.

The similarities between the symptoms of the carps infected by *Aeromonas hydrophila* were observed in other parts of the world. [10,11,12].

Low percentage of fish dying with bacterial symptom show that other factors are affected on fish mortality. Only 16 percent of the fish were isolated of bacterial agent.

However, in this study, the motile *Aeromonas* have been isolated, but these bacteria with low virulence, so you can not say the bacteria is the primary cause mortality. However, similar studies in other parts of the world, including Poland [3] China [5] India [11] Turkey [13] South East Asian countries [14] These bacteria are the primary cause of disease.

Despite numerous reports of isolation of the internal organs of the fish, not the least of these bacteria as the primary cause of mortality in this study. As studies have shown that other factors involved in the loss, risk factors for viral [15]. environmental and nutritional [6] or other unknown causes serious losses in the loss of the main reason for finding More research is needed 's. It seems that most of the organic material is sensitive bacterial fish diseases.

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