

Infection Rate of Common Carp (*Cyprinus Carpio*) to *Lernaea Cyprinacea* Parasite in Warm Season of Year in Farming Ponds of Shushtar Region in Khuzestan Province

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ABSTRACT

This study was designed to investigate the rate of common carp (*Cyprinus Carpio*) to *Lernaea cyprinacea*. 275 pieces weighing more than 150 grams were caught from 4 fish farms in the Shushtar city located in the four cardinal directions, in September and October of 1388. The collected samples were placed in 20 liter drums containing 10% formalin and then were transferred to the laboratory of Veterinary School in University of Kazerun. The Samples were studied in terms of total length, standard length, body height and weight. In the next stage, the infected fish were separate from other fish and infected were evaluated regarding *Lernaea Cyprinacea* infection. : The results showed that 69 % of the total numbers of fish caught were diagnosed with *Lernaea Cyprinacea*. Frequency of fish's infection to the parasites was reported as 09/25%. Also, investigation of the relationship between total length and weight with infection rate to *Lernaea Cyprinacea* showed a significant relationship between the variables (parameters) above with the rate of infection to the parasite. This study determined the prevalence of carp fish infection to *Lernaea Cyprinacea* as 09/25%. This study also indicated that a significant relationship between the total length, standard length and weight with the rate of infection.

Key words: *Cyprinus Carpio*, *Lernaea Cyprinacea* parasite, farming pond, Khuzestan.

INTRODUCTION

Early human provided their food needs through hunting and gathering food around them, but population growth of the world and subsequently Iran increased need to variety of plant and animal proteins. In recent decades people have come to the conclusion that by farming Aquatic animals can provide production beyond existing products¹. Common carp with scientific name of "Cyprinus carpio", was originally native to Central Asia and

over many centuries has spread naturally to different regions of the world or has transferred by human. To identify this fish, observing two pairs of mustache around the mouth and continuous dorsal fin will suffice. Its dorsal fin is long and reaches near the caudal peduncle. Two pairs of mustache around the the lips and its pharyngeal teeth are three rows (no teeth on the jaws). It is an Omnivore fish and eats benthic organisms (worms, molluscs, crustaceans, etc), baby frogs, baby fish, fish eggs, seeds, plants leaves and the like. It has High growth rate and

is relatively resistant to adverse conditions and environmental conditions. It also weighs up to 15 kg. In our country, in some areas such as Khuzestan, in the first year of farming, the fish weighed gets more than 5/1 kg (2).

Given the importance of fish farming industry in recent years, particularly warm water fishes including carp in Iran, Investigating illnesses and injuries in these species is essential. Of course the aquaculture industry is faced with many threats such as different diseases including viral, bacterial, parasitic, etc.

Lernaea cyprinacea and occurrence of *Lernaeasis* in farmed warm water fishes is a major problem of this industry all over Iran. The province of Khuzestan is the most important one regarding *Lernaeasis* that encounter with the illness almost all year. The reason for this is suitable temperature range in most months of the year for rapid growth and proliferation of the parasites especially from early spring to late fall when water temperatures is typically between 30-22 ° C in pools. Proliferative capacity of the parasite is high so that in 22-17 days of the complete life cycle, the parasite is repeated³. Parasites are considered causes of small damages to large ones in both marine and farmed fishes and lead to pathological changes, reducing the quality and lessening marketability of fish. The recent spread of parasites throughout the world is performed easily due to lack of adequate health and veterinary supervision in process of fish importing. Controlling many important parasitic diseases is still far from satisfactory condition and more supervision is needed. Aquaculture development over recent decades, and concern about the prevalence of parasites has caused experts' more attention to this problem created by parasites and their importance in decreasing Aquatic animals' reproduction power⁴. In general, common crustacean parasites of fresh water fishes of Iran belong to two classes of spp. *Acartia* and *branchiura*.

In the range of spp. *Acartia* the following fishes are discussed: *lernea*, *Ergasilus*, *Lamproglena*, *Traclea stes*, *pseudo Traclea stes*, *actress*, and *caligus*. And in the range *branchiura*, *argulus* is discussed. *Lernaea* is one the most well-known parasitic crustaceans that reproduces continuously

in warm seasons as subcutaneous parasites, and its adult type sets on the skin of every four warm water fish species farmed in Iran (grass carp, BIGHEAD, silver and common) that can create skin damage effects, reduced growth and effect on fish behavior and decrease fish resistance against stress factors .also, presence of parasites can cause negative effects on the marketability of fish. Different species of *Lernaea* are among the most dangerous parasites of farmed freshwater fish in the world and Iran; and with the development of focused fish farming; their importance is felt more sensibly. They are specila of tropical temperate regions. So far, 40 species of *Lernaea* have been recognized in the world, 32 species of which are named and some have synonyms. *L.ctenopharyngodoni*, *L.esocina*, *L.cyprinicea*, *L.elegans*, *L.carassi* are species of the *Larena* genus⁵. In fish farming fields of Iran, because most of them use resources of surface waters such as rivers, At about 6-10 months of the year the average temperature of swimming pools gets above 14-15 ° C, there is the possibility of disease occurrence. On the other hand, the tadpole is one the disease transmission factor⁵. Parasite has a wide host domain and large number of fish family particularly Carp species can be prey of parasites. Also, the parasite does not require an intermediate host for growth and development³.

METHODS

Sampling was done from fish farms in Shushtar city. These fields are near Gargar branch of the Karoon river .Samples were taken from four farms in the four cardinal directions of pools towards each other; that is from northernmost to the southernmost, easternmost and westernmost and from major fields.

Selected fields included

- 1 Nourali Chehelparzin farm with management of Afshari Brothers that is 55 hectares.
- 2 Fish farming field with management of Afshari and Pourafshary that is 52 hectares.
- 3 Fish farming field with management Akhavan Nassaj that is 45 hectares.
- 4 Fish farming field with management of Seyed Mahdithat is 48 hectares.

One sampling was done on the date 6/23/88 from field, 1 and 2 the total number o samples was 150 (78

samples from field 1, and 73 samples from field 2).

Another sampling was done from field 3 on the date 6/31/88 and the number of samples was 55. Sampling from field 4 was done on the Date 07/24/88 and number of samples was 70. The total number samples taken from four farms was of 275. From each field, 4 pools that its fish weighed up to 150 grams were selected randomly and using a hand net (vetch)¹ fishes were caught. It was tried to have equal number of launching net in each pond and also worker fisherman was asked to do hand net throwing from four different locations in the pool to perform sampling from different points in pool. Finally 80-60 fish samples were collected from each farm. To stabilize the Samples taken, they were put in 20 liter drums that were contained 10% formalin and the door was shut well and drums were transferred to laboratory of veterinary school in KAZERUN. In vitro studies were conducted on fixed fish in 10%

formalin, and in each time two drums were spilled in plastic tubs. At first the fishes' skin were removed from formalin and then healthy fish were separated from fishes with parasites were and each category were counted separately. Finally the Data was put in tables and some of lesions caused by parasitic were cut from the body surface of fish by scalpel blade and forceps with graving method. Samples were put under the microscope and at the end the sample under the microscope were photographed. The data obtained were analyzed by spss software and the results are presented in the results section.

RESULTS

Result of examining infections of common carp (*Cyprinus carpio*) in a warm season is as follows: From total number of 275 fishes caught, 206 were healthy and the rest of the 69 pieces were all suffering from parasitic lesions. Digram (1) shows the number of healthy and infected samples of common

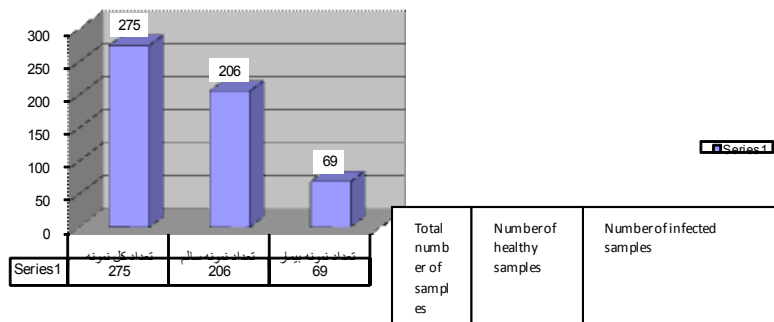


Diagram 1: Samples of healthy, infected and total number of common carp under study of Lerean parasitic infection in Shushtar region of Khuzestan

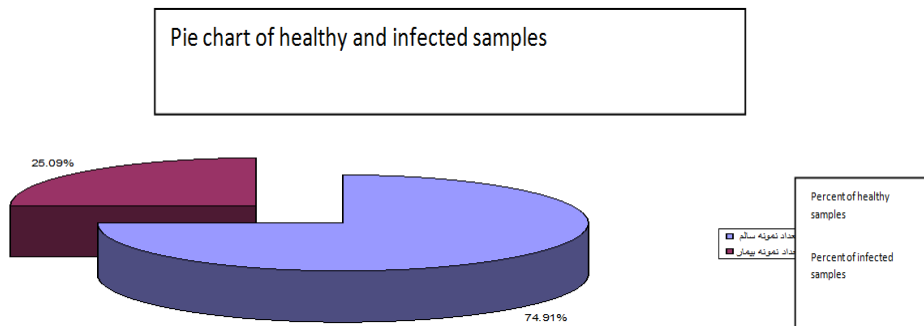


Diagram 2. Percentage of healthy and *Lernaea cyprinacea* infected carps in shushtar region of Khuzestan

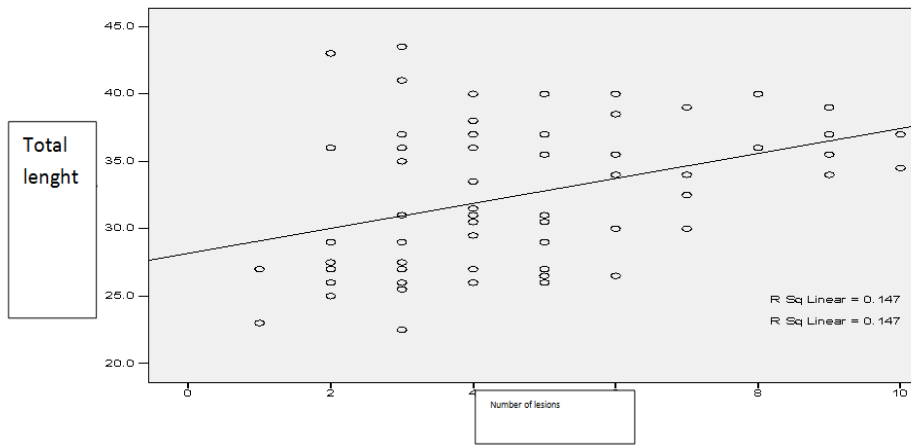


Diagram 3: Scatter plot of the total length and number of lesions of *Lernaea cyprinacea* in common carp

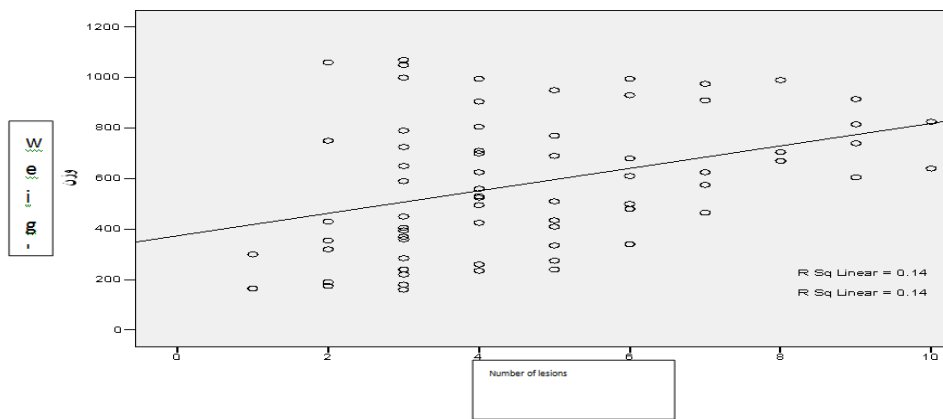


Diagram 4: Scatter plot of weight and number of *Lernaea cyprinacea*

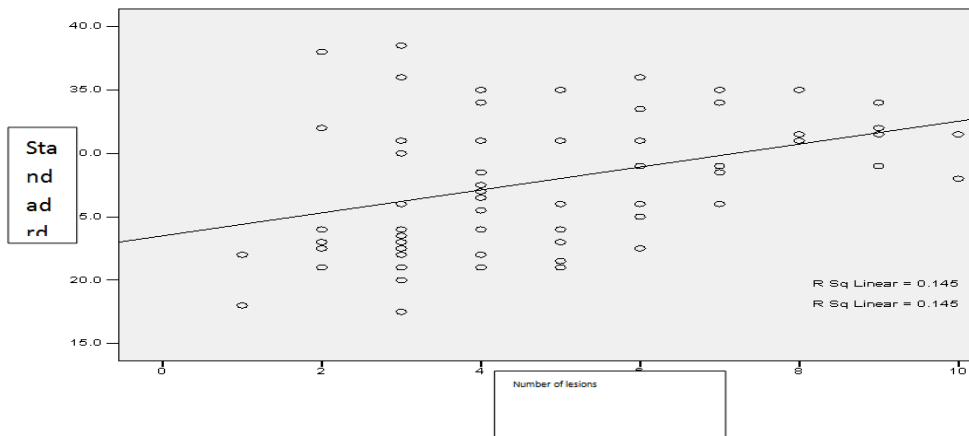


Diagram 5: Scatter diagram of standard length and number of *Lernaea cyprinacea* lesions in common carp

carp under study of Lerean infection in the region of Khuzestan.

Estimating percentage of common carp infected to *Lernaea cyprinacea*

In the next step, percentage of healthy samples and infected with parasites were determined so that we know what proportion of statistic population form. This number shows what percent of statistic population are infected with parasite. This number can be very effective in decisions and research in this area. (Diagram 2).

The scatter plot that examines the relationship between total length and number of lesions of *Lernaea cyprinacea* shows a significant relationship between these two variables.

This diagram, like the previous diagram shows significant relationship between these two variables. As the numbers and relations show, the relationship between number of parasitic lesions in fish with length or weight is significant. ($P < 0.05$).

Lesions in common carp.

This diagram like the previous one shows significant relationship between the two variables. As the numbers show the relation between numbers of parasitic lesions with standard length is significant. ($P < 0.05$).

DISCUSSION

In this study, 275 common carp fishes from fish farming ponds in the city of Shushtar in Khuzestan province were investigated regarding infection to *Lernaea cyprinacea*; that 69 of them were infected with *Lernaea cyprinacea* and contamination rate was 09/25% which is consistent other studies in the area of Shushtar. But the differences of contamination in this area with other areas in the world can be attributed different climatic conditions, sensitivity, and other conditions in the incidence rate of the epidemic parasite. The survey conducted by the Kularatne *et al* (2002) reported species Sensitivity of resistant carps against *Lernaea cyprinacea* than *lernea minuta* parasites⁶. In a survey by Tasavar *et.al* in Mozaffargar of Pakistan, 120 fish (CATALA CATALA) were studied for laeran parasites more than one period of twelve months

from February 2000 to January 2001. And six species of laeran were isolated: *lernea cyprinacea*; *lernea polymorpha*; *lernea Ctenopharyngodo*; *lernea arcuata*; *lernea lophiara*⁷. Also, In a survey by Jalali and Bozorgmehr (20062004) on eye parasites of freshwater and saltwater fishes, among total of six parasites species investigated LERNAEA CYPRINACEA was separated from isolated from *Cyprinus carpio* and *Hypophthalmichthys molitrix* (8). In a study by Abdullah & Bilal (20062005) in the Kurdistan region of Iraq, from 307 freshwater fish belonging to 11 species of fish of the carp family studied, 22 parasites were selected including four species of protozoan, six from single gene and two from two gene species, two parasites from tode, three from nematode, one from *Acanthocephala* worm and finally four from crustaceans were identified. The five parasitic species provide the first report in Iraq. In addition, some fish species were new report of host for some species of *Lernaea cyprinacea*⁹. In a study by Mohammad Nasim Khan and colleagues (2003) in Putahar region in Pakistan and surrounding areas including small dams of Min Hart and Man jin , 78 fishes belonging to five species (*Cirrhinus mrigata*(Mori)- Grass carp- Silver carp- Common carp- *Labio rohita*(Rohu) of capar were studied that nine different parasites were found in them. (*Chilonella sp-trichdina sp-lernaea cyrinaceae-Ergasilus sp-Argulus sp-contracaecum larvae-Rhabdochona charsddensis-Grodactylus sp-piscicola sp*). Most of the fishes showed infection except grass carp that was only infected with *Lernaea cyprinacea*. Common carp is the most susceptible to infection, while the grass carp showed the lowest infection to parasite¹⁰.

In a study by the Varaste (2009) That investigated the prevalence rate of infection to Lerean in bighead carp in the city of shushtar , the only species found on a infected fishes was *Lernaea cyprinacea*¹¹. Also, in a study by Beladi (1388) on the grass carp fish of fish farming ponds in the city of shushtar, Khuzestan province, the only species found on infected fish was *Lernaea cyprinacea*¹². In the present study just common carp was examined regarding incidence *Lernaea cyprinacea* and the only species found on contaminated fish was *Lernaea cyprinacea*. many reports have been published on The contamination rate in fishes .in a survey by Firoz Fadaei Baba mokhayer, Hadi Ghorbanim

During the eighth consecutive months from August 98 to April 99 in the 160 fish in Choghakhour wetland of Chaharmahal Bakhtiari, 38/54% of infections LERNAEA CYPRINACEA was observed and 62/45% of them were not contaminated. Among the tested fish, the highest percent of infection was for common carp (13/8%) (13). In another study by Frank & Bulow *et al.* in the basin Blackburn Fork on 13 species of fish collected, Ten out of 13 species were heavily contaminated with LERNAEA CYPRINACEA in warm season of the year (14). The study, by Tasavar and colleagues (2009) conducted on grass carp in Multan, Pakistan showed that 105 of the fish were affected by the parasite. In this study, four species of Larean were recorded that polymorpha Larean was the most (54/7%) and then there was LERNAEA CYPRINACEA (53/6%) (15). In another study by Durham *et al.* (2002), they collected species monthly from Ranzas River from September 1996 to August 1998 at three stations in the Canadian River, New Mexico and Texas. Except during the period May to August that monthly sampling was done 2 times, the results showed that (2398 shiners in Arkansas river, and 2316 perch fish were collected) 3/1% and 8/0% were infected with LERNAEA CYPRINACEA parasite (16). Also in the investigation by (2009) on BIGHEAD carp in fish farming ponds of Shushtar city in Khuzestan, maximum parasites per fish was 5 and the lowest prevalence was 1. The average infection rate was 77/2¹¹. In the research conducted by Gutierrez and colleagues (2005) on 417 common carp of Llobregat river of Spain, it was found that 35 of them were diagnosed with *Lernaea cyprinacea*¹⁷.

In the present study, the highest number of infections in common carp to *Lernaea cyprinacea* was 10 and the lowest prevalence rate of infection was 1 x 65/4 and the average rate was 65/4; that in comparison with other studies conducted in the region by Beladi and Varaste average number of contaminations are close to each other. Studies have been conducted about whether there is a relationship between the length and weight with infection rate. For example, a study conducted by Gutierrez and colleagues (2005) on infection rate of carp fishes in a river of Spain, showed direct relationship between

the number of parasites on fish and fish length¹⁷. In a study by Tasavar *et al.* in Mozfrgar of Pakistan on 120 Katla fish for investigating Larean parasites within a period of twelve months from February 2000 to January 2001, the results showed that contamination is less in the fish whose body length is 25/00- 25 /75cm and their maximum length is 25 /75-3. Also, Parasitic infections in the body weight to about 160 to 258 g increases about 456 -553g, while almost no parasitic is observed in heavier fishes (more than 553)⁷. In a survey by Tasavar and colleagues (2009) on 597 grass carp in terms of LERNAEA CYPRINACEA in Multan, Pakistan, the following results were obtained in relation to the length of the fish and Larean attack: This parasites is most prevalent in length range of 9-14 cm and least prevalent in length range 15 -20 cm and above 20cm¹⁵. In a study done by Beladi (1388), the smallest number of parasites on fish was 1, with lengths 28, 32, 39, 40 and 43 cm. The maximum number of parasites on a fish was 32 in fish with 37 cm length¹². In a study conducted by Tasavar and colleagues (2009) on 597 grass carp in Mrlyan of Pakistan, It was found that infection with lareana in weight group 2501500 was more prevalent, while this parasite was not found in weight group between 6500 to 4501 and 8500 to 6501. It appears that fish with lower weight are more sensitive¹⁵. In a study by J. Ann Dvrvfs Kykh (1993) the differences in infection with spp. *Acartia* and frequency distribution status of Larean in keronal Carp (a small Eurasian carp, which has a dark green back, golden yellow sides and reddish fins) that depends on the length of the body and type of carp were studied. In this study, the lowest contamination rate with spp. *Acartia* was reported the fishes with 118 cm body length in comparison with the species with length 18-12 and 18/5-34 cm¹⁸.

CONCLUSIONS

This study it was found that the infection of carp fish with *Lernaea cyprinacea* was 09/25%. Also, the results of the present study indicated that there is a significant relationship between the total length, standard length and weight with the rate of infection.

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