



UNIQUE JOURNAL OF PHARMACEUTICAL AND BIOLOGICAL SCIENCES

Available online: [www.ujconline.net](http://www.ujconline.net)

Research Article

**HISTOPATHOLOGICAL INVESTIGATION ON THE PREVALENCE OF GILL NECROSIS IN RAINBOW FISH IN THE GHEZEL FARM IN ARJAN PLAIN IN FARS PROVINCE**

Yousefi Alireza<sup>1</sup>, Sadeghi Limanjoob Reza<sup>1\*</sup>, Shafiei Jahromi Nazanin<sup>2</sup>, Farzam Mohsen<sup>3</sup>, Zare Afshin<sup>3</sup>, Tavakoli Rad Hossein<sup>1</sup>, Farzam Mohammad<sup>3</sup>, Mohammadi Sahar<sup>5</sup>, Farokhnia Farzaneh<sup>6</sup>, Rahmanian Elham<sup>7</sup>

<sup>1</sup>Department of Aquatic Animal Health, Veterinary School, Kazerun Branch, Islamic Azad University, Kazerun, Iran

<sup>2</sup>Department of Nursing, Islamic Azad University, Firuzabad Branch, Firuzabad, Iran

<sup>3</sup>Department of Physiology, Veterinary School, Kazerun Branch, Islamic Azad University, Kazerun, Iran

<sup>4</sup>Department of Physiology, Medical School, Kazerun Branch, Islamic Azad University, Kazerun, Iran

<sup>5</sup>Department of clinical Biochemistry, Kermanshah University of Medical Sciences, Kermanshah, Iran

<sup>6</sup>Department of Biology, Science and Research Branch, Islamic Azad University, Fars, Iran

<sup>7</sup>Anatomy and embryology, Cellular and Molecular Gerash research center, Grash school of medical science, Shiraz University of medical Science, Shiraz, Iran

Received 26-04-2015; Revised 24-05-2015; Accepted 22-06-2015

\*Corresponding Author: **Sadeghi Limanjoob Reza,**

Department of Aquatic Animal Health, Veterinary School, Kazerun Branch, Islamic Azad University, Kazerun, Iran.

Tel: +989173243418, E-mail: [dr.r.s.limanjoob@gmail.com](mailto:dr.r.s.limanjoob@gmail.com)

**ABSTRACT**

**Introduction:** Consumption of fish meat, according to different reasons is preferred to the other domestics. Gill necrosis syndrome is one of the most important diseases in aquaculture industry. Due to the importance of fish husbandry in the supply of food resources of societies, the purpose of the present study is histopathological investigation on the prevalence of gill necrosis of the Rainbow fish in Ghezel farm.

**Method:** In this study, 200 pieces of Rainbow fish of Arjan plain in Kazeroon fished and kept in the rubber case with ice powder and then was sent to the lab. In the laboratory of fish biology faculty of veterinary medicine, to measure the biometric properties, such as weight, length, etc as well as clinical reviews and after necropsy, and recording observations, fish gills were separated and moved to 10% formalin solution. Then with the preparation of histological sections of Gill samples and hematoxylin eosin staining, microscopic study was done.

**Results:** In 64% of the samples, some microscopic signs were observed; and in 36%; there were no pathology sign has been reported. The most important microscopic symptoms include 25% of cytoplasm membrane splinter, 17% hypertonic of cytoplasm, 9% nucleus hypertrophy, 7% pyknotosis, and 6% is the connective tissue replacement.

**Discussion and conclusions:** The most important factors that create the Gill necrosis due to the contents of the mentioned results in summary are high density, stress, processed foods lacking in antioxidants and vitamins, along with large amounts of fat in the food expired food and irregular food program that have been caused acidosis in Gill.

**Keywords:** Gill necrosis, Trout, Rainbow, Arjan Plain.

**INTRODUCTION**

Fish has been as an important source of food for mankind. Uniquely from the beginning catching fish were just from the natural resources, but today with the advancements and aquaculture, a significant portion of the food supply would be in this way<sup>1</sup>. Probably the aquaculture history goes back to two thousand years before Christ, in the country of China, in average fish meat is currently provide 6% of the total amount of human consumed protein and 24% of animal consumed

protein<sup>2</sup>. Despite the aquaculture history in the world, this activity was started in 1301 with the farming of dice fish and since 1338 with farming of rainbow fish<sup>3</sup>.

Rainbow fish (*Onchorhynchus mykiss*) is a kind of cultured fish that has been domesticated from the late 19th century and has been farmed in usable and marketable form since then. Now duplicate of the trout breeding industry is developing and its importance, particularly in countries that are able to prepare sweet or salty water environments for raising this fish are increased<sup>4</sup>.

The capabilities of very high compatibility, and also the easy duplicate, causing introduce the fish to different regions of the world and now in most parts of the world with a different climate is cultured. Breeding of salmon in Iran do not have a long history but the high progress in recent years in the field of education has taken place, so that the production rate of 440 tons in 1368 has increased to 45,000 tons in 1385<sup>3</sup>.

Breathing apparatus of this kind consists of four rows of broad field fish gills on each side. These strands have been formed of epithelial cells, Pilar and chloride (in salty water). The first two fields will play an active role in the action of phagocytes and so is part of the non-proprietary immune system<sup>4</sup>. The gills are protected by the mechanical Cap. Gill in the Pharyngeal Gill area have a bow that are to help guiding food to esophagus side<sup>4</sup>.

Chilodonilasis is parasites of the skin and gills of freshwater and saltwater fishes; and diseases caused by it is called chilodanlus<sup>5</sup>. Active fibroses multi folios are one of the most dangerous external parasites of freshwater fishes, which create the active ferries the white spot disease. This disease is created a devastating toll on the fish. In marine fishes, there is a similar parasite that is called crypto carrion irritancy<sup>6</sup>. The parasite feeds on tissue secretions and particles of destroyed cells. The epithelium getting thin in the beginning, but gradually began to be hyperplasia and growing thicker<sup>6</sup>.

The genus lerneah is of the lerneian family. And has more than 40 species. The most important species of this genus is aceperiance. Make the boils incapable scars on the trunk, scalp, flippers and gills. In severe infections may be worn across the body of the fish from small and large wounds and thick mucus cover on the scales<sup>8</sup>.

The cryptobia genus is of the most common protozoan stigma flagellate parasite. Numerous species of this genus cause pollution and the incidence of the cryptobioses disease among the economic fish in freshwater and saltwater of the world<sup>6</sup>.

In infections by cryptobia bronchioles, the gills get red, but it is an unnatural state; and abundant mucus accumulates in the skin and gills<sup>7</sup>. Jiroductiluse is as the most important parasites of a group of single hosting parasite (monogen) that is 0.5 mm long and is willing to color white. This parasite is rarely to be seen with the naked eye and occasionally merge in skin and rarely in gills and fish eye<sup>6</sup>.

According to the mentioned content and the importance of fish as a source of nutrition, the aim of this project is Investigation on prevalence rate of Gill necrosis in Rainbow fish in Arjan plain Fars in Ghezel farm.

## METHODS

This study is done on rainbow trout of Arjan Ghezel farm in Arjan plain area of Fars province.

Past investigations, shows that this kind of disease was mostly occurred in summer and in fish with weight ranges of 350 to 450 g: (Socket Kindmire and Nazmi polat-2006), mentioned research also was in the summer 2009 on 200 pieces of rainbow trout of the mentioned weight.

After taking samples from Arjan Ghezel farm, we put them in the cases with ice powder. And quickly were transferred to the laboratory of fish biology faculty of veterinary medicine, in Kazeroon. In lab the biometric properties like weight, length, and other appearance signs were firstly measured and then recorded. Then with the autopsy instruments including surgical forceps, scissors, scalpel, Sean, PIN, etc. autopsy was carried out on the samples. After the above information and shooting from the steps listed, samples was moved to the to pathology laboratory Faculty of veterinary medicine and tissue remains with dimensions of 1 × 1 cm of the liver of catching rainbow trout fish categorized and transferred to 10% formalin. Then from each sample, two slides that each slide contains two tissues sections; were prepared. Then the histology studies were done by optical microscopy.

## RESULTS

The most important step in the histopathology of Gill necrosis is observation of various cycles of tissue necrosis that can vary depending on the factors causing symptoms. In the majority of the samples Gill necrosis complication were observed. In this research it became clear that 127 examples were showing this disease and 73 examples don't show signs of the syndrome. The most important microscopic signs include 25% of cytoplasm membrane splinter, 17% hypertonic of cytoplasm, 9% nucleus hypertrophy, 7% pycnosis, and 6% is the connective tissue replacement (Chart 1) (Figure 6 to 1.)

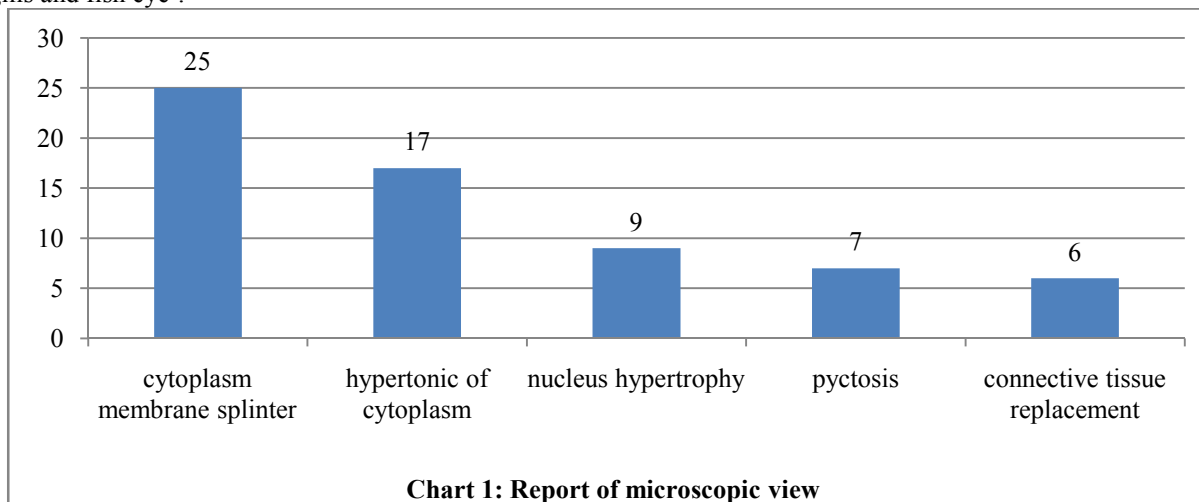




Figure 1: Necrosis strings of Gill salmon fish of Arjan plain with 1000 magnification and hematoxylin eosin staining



Figure 2: Trout fishes hypertrophy of Gill filaments Arjan plain with 4000 magnification and hematoxylin eosin staining



Figure 3: Hyperplasia of secondary disciplines in Rainbow Trout fish Gill in Arjan plain with 4000 magnification and hematoxylin eosin staining



Figure 4: nuclear hypertrophy in trout fish Gill plain Arjan with 4000 magnification and hematoxylin eosin staining



Figure 5: healthy Gill filaments in trout fishes Arjan plain with 4000 magnification and hematoxylin eosin staining



Figure 6: Hyperplasia of trout fishes Gill filaments Arjan plain with 4000 magnification and hematoxylin eosin staining.

## DISCUSSION

Gill necrosis of trout fishes causes by bacterial agents, fungal, parasitic, viral, natural factors and effects, and toxicity, nutritional factors and complications and neoplastic diseases. In this study on the 200-piece of rainbow trout fishes of the Ghezel Arjan farm located in the Arjan plain area of Fars province was determined that 64% were samples show signs of gill necrosis. The high rate report of the presence of the disease on the farm can be compared with the results that other researchers have gained.

It has been said that Gill necrosis (Fin Rot) in *Metolius Odious trosolos* fish from the South Baltic Sea, with the alfa factor of tumor necrosis do not have main role in the Amoeba gill necrosis<sup>9</sup>. Also after the review on rainbow trout concluded those genetic parameters has an important role in the immunity of salmon fishes of Atlantic Ocean against Gill necrosis. (19finals). It is expressed in some researches that took place to avoid bacterial Gill disease (BGD) in small fishes of first generation, in this case by adding 25% kg of ozone in Rainbow Trout fish food were able to prevent the incidence of Gill necrosis to a large extent<sup>10</sup>.

Bebakav with Megarton in the year 2003, in a the overall research for hypothetical danger factors in bacterial Gill disease (BDG) in young rainbow trout growing in fish farms in North America are concluded that, rainbow trout fishes farms, which for whatever reason have been faced with Gill necrosis syndrome had more losses than pools which only were affected with Bacterial Gill Disease<sup>11</sup>.

Ferguson and Morrison in 2006, review the effects of gill diseases on Gill mucus-producing cells of the trout fish<sup>12</sup>. In this research it became clear that fishes with the Gill disease experience, had more Gill mucous cells especially in the secondary blade. What can be obtained is, the most noticeable reason for creating the Gill necrosis disease is the management agents.

## CONCLUSION

The most important factors, create the Gill necrosis due to the contents of the mentioned results in summary form are, high density, stress, processed foods lacking in antioxidants and vitamins, along with large amounts of fat in the food expired foods and irregular food program cause acidosis in Gill. The sum of the results obtained in the mentioned research can be

said that the main factor causing Gill necrosis disease can be mismanagement. In the research and observations from Ghezel Arjan farm, factors such as large density of fishes and fatty food and expired foods, and sudden change of diet approved.

### REFERENCES

1. Azari Nakami GH. health management and preventing fish disease, 1996.
2. Ebrahimi, A. Pamphlets Public ichthyology, MA; Esfahan University of Technology, 1996.
3. Nafisi Behabadi M. Guide lines in rainbow fish farming Boushehr Persian Gulf University, 1998.
4. Mashae A. 1999. Guide to rainbow fish farming Nourbakhsh publications, 1999.
5. Dehghani AA. Parishan Wetland ecosystems. Mehr Publications, 2004.
6. Jalali, B. Parasites and parasitic diseases of freshwater fishes of Iran, Iranian Deputy Publishing proliferation and aquaculture, 1997.
7. Jalali, B. Branshy necrosis in farmed fish, Iranian Fisheries Research Institute Publications, 1986.
8. Brusle J. Occurance of kills pathological, toxicological mechanisms, ecological and economic impact, 1995.
9. Ghaffari, M., A. 2000. Sharifpour, Water quality and fish health (translation). Hatching and Fisheries Department, Iranian Journal, 2000; 20-107.
10. Gabriele P, Hoffmann R, Klinger H. Environment-induced gill disease of cultured rainbow trout (*salmo gairdneri*), Institut for hydrobiology and fischereiwissenschaft der universitat hamburg, Olbersweg 24, 2 hamburg 50 federat republic of Germany. 2007.

Source of support: Nil, Conflict of interest: None Declared