



# Some Parasitic and Viral Fish Diseases, and their Relationship to the Pollution of the Aquatic Ecosystem

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**Abstract**

All fish carry pathogens and parasites, usually very harmful to the health of any fish if symptoms are high. Most of the diseases known to fish are those of aquarium fish and, more recently, farmed fish. Disease is a major factor affecting fish mortality, especially when the fish are young. Fish can limit the effects of pathogens and parasites by behavioral or biochemical means, and these fish have reproductive advantages. Interacting factors lead to the transformation of a low-grade infection into a fatal infection. In particular, things that cause stress, such as natural drought, pollution or predators, can trigger an outbreak. The disease can also be a particular problem when pathogens and parasites transmitted by introducing species affect native species. The introduced species may find it easier to invade if predators and potential competitors are decimated by disease. Pathogens that can cause disease in fish include: Viral infections, infections, such as *Pseudomonas fluorescens*, that lead to rotting fins, unicellular parasites, Some worm parasites such as Eustrongylides.

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## Fish diseases

Fish differ among themselves with their effect on changes in the physical and chemical properties of the water in which they live. The water cycle is an important aspect of the aquaculture system and fish farming and depends on it for breathing, feeding and growth, as physical and chemical parameters (dissolved oxygen, pH can lead to salinity, ammonia, temperature) and poor management practices stress farmed fish, thus making them more susceptible to disease [1-3].

Khan (2009) clarified that fish overcrowding, lack of nutrition and poor water quality may lead to the spread of diseases and parasites and the occurrence of secondary pathological infections, that changes in the environment in which fish live an effective role in infecting them with diseases, as all vital activities in fish such as (osmotic acclimatization, respiration, Feeding, excretion, reproduction) are affected by the environment, and pollution is one of the important environmental factors that may lead to the emergence of an imbalance such as lack of dissolved oxygen, increased salinity, high water temperature and change of natural nutrients, and these factors, together or separately, depend on weakening the vitality of fish and reducing their ability Immunohistochemistry [4,5].



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The processes of draining from agricultural land and dumping wastewater without treatment directly into the environment, as well as the waste of laboratories thrown into water bodies have negative effects on living organisms in the aquatic environment [6], and that water quality management and control is important to ensure the health of fish, as well as Some of the variables that may occur in water such as pH, dissolved oxygen concentration, nitrate and nitrite may require the development of aquatic monitoring programs [7,8].

### The increasing pollution of aquatic ecosystems

The increasing pollution of aquatic ecosystems that include thousands of natural chemicals and human activities has become one of the most important environmental threats facing human health and the environment, and bacteriological analysis of fish pond water is very important in the field of aquaculture, because it gives an idea of the potential risks that may occur to fish, There is great interest in the problems of pollution of the aquatic environment from microbes and disease-causing organisms such as (bacteria, viruses, parasites, fungi), harmful algal blooms, increased Ultraviolet (UV) radiation, and enhanced or decreased nutrients [9,10]. Bacteria are one of the most important pathogens in wild and farmed fish, which causes serious economic losses, and infection appears due to stress that leads to weakening of natural defenses against pathogens such as crowding, lack of dissolved oxygen or excess of ammonia [11].

Fish are exposed to many factors that make them more susceptible to bacterial infections, including: fish injuries or scratches, increased culture density in their area, temperature changes, lack of dissolved oxygen. Some human activities such as artificial feeding in fish culture ponds have an effect on the diversity of the bacterial load. In many cases, intensive fish culture is accompanied by several pathological problems due to the presence of opportunistic pathogens, as well as organic loads that stimulate the spread of opportunistic bacteria [12], and due to the spread of pathogenic bacteria in the water, fish farmers often face problems in their stocks, and thus the use of antibiotics and chemical treatments remains a strategic option to combat diseases, but it led to the emergence of several types of bacteria resistant to antibiotics [13].

The fish wealth is distinguished by being a renewable resource, that is, it reproduces and compensates for what is lost through fishing, which allows its exploitation. In addition, it is a source of national income for many countries Developed [14,15]. Fish as hosts to a large number of parasites, some of which are pathogenic to other fish or may be pathogenic to invertebrates. Carnivores, including humans [14], and some parasites cause mechanical damage when they migrate through the tissues. It is caused by pressure on the tissues in the connective tissues, which hinders the process of growth and reproduction, and a number of parasites Fish or its larval stages are transmitted to humans by eating raw or undercooked fish [16]. Some parasites cause mechanical damage when they migrate through tissues, it is caused by pressure on the tissues in the connective tissues, which hinders the process of growth and reproduction, and a number of parasites Fish or their larval stages are transmitted to humans by eating raw or undercooked fish [16]. It is the most parasite common fish *hasorum Cryptosporidium*, *Capillaria tomentosa*, *Capillaria amurensis*, *Capillaria baicalensis*, and *iraqensis Neochinorhynchus*.

### The pathogenic bacteria associated with fish

It be classified into two groups: indigenous bacteria (*Clostridium botulinum*, *Monocytogens*, *Shigala sp*, *Staphylococcus aureus*, *Salmonella sp*), and non-indigenous (*Vibrio spp*, *Aeromonas spp*) [17]. Information on the effect of water quality on the presence of bacteria under actual field conditions is limited, and most of the previous studies described only bacteria that were isolated from water, sediments, or different fish organs, while they lacked the identification of their association with environmental variables [18].

[19] showed that bacterial diseases in fish farming ponds depend on the presence of the pathogen, the quality of the water and the general health of the fish, and that the balance of these factors can guarantee the health of the fish without the need to use antibiotics, and the health of the water body can be maintained by ensuring the quality of the water Good stocking, moderate stocking densities, and balanced nutrition. It is also important to eliminate pathogens and try to prevent them from spreading, such as *Vibrio* and *Aeromonas*.

[20,21] offer specific preventive alternatives to use to prevent disease rather than chemical treatments, Such as vaccination and immunostimulants such as Probiotic and Prebiotics, but chemotherapy with antibiotics is still the preferred method for controlling most bacterial infections despite the development of bacterial resistance to antibiotics [22]. [23] to the widespread use of several types of antibiotics, the most widely used of which are Oxytetracycline and Chloramphenicol because of their high efficacy against bacterial diseases.

### Fish diseases are divided into two main categories

- 1- Infectious diseases (occurred as a result of infection with parasites, fungi and viruses).
- 2- noncommunicable diseases (diseases that occur as a result of environmental and genetic changes, nutritional deficiency diseases and tumors) [24].

We consider fish diseases as one of the most important reasons that restrict the development of fish production, and there were attempts to modify the immune system in fish, so a study was conducted in India to search for ways to develop immunity using the extract of the medicinal plant *Ocimum sanctum* at different concentrations (10,21,31 parts per thousand) with *A. Heat-killed hydrophila* and *C. Carpio* treated with it, the fish treated with this extract did not experience any mortality, and there was a clear weight increase in concentration [10 parts per thousand] more than the other treatments, in addition to an increase in phagocytic cells and their activity in relation to the standard treatment and other treatments [25]. [26] explained that many antibiotics were proven unsafe, their circulation and use was prohibited, so the recommendation was to search for alternatives to enhance the health of aquatic organisms, such as (reducing organisms by combating pollution, cleaning ponds from waste, using probiotics, protecting organisms from pathogens, replacing Pond water is periodic) and he emphasized the use of (Probiotic) because it is one of the competitive exclusions for the intestinal microorganisms, as it replaces harmful microorganisms with beneficial ones, and it produces acids, which are considered as inhibitors of the growth of pathogenic bacteria and prevent infection, accordingly the bio-booster is one of the immune stimuli that produce enzymes In addition, bacteria cannot develop immunity to a probiotic, but they have the ability to build them up against antibiotics.

The bacterial diseases in fish lakes come from the polluted environment and the general health level of the fish, and the environment can be clean and the fish health is normal, then balance is restored without the need for antibiotics. This is done through the adoption of: (healthy nutrition, eliminating pathogens, trying to prevent their spread) Vaccines can be used to enhance resistance against diseases, as antibiotics play an important role in preventing diseases and a therapeutic role when the disease spreads [19, 27].

### Conclusion

Fish can limit the effects of pathogens and parasites by behavioral or biochemical means, and these fish have reproductive advantages. Interacting factors lead to the transformation of a low-grade infection into a fatal infection. In particular, things that cause stress, such as natural drought, pollution or predators, can trigger an outbreak. The disease can also be a particular problem when pathogens and parasites transmitted by introducing species affect native species. The introduced species may find it easier to invade if predators and potential competitors are decimated by disease. Pathogens that can cause disease in fish include: Viral infections, infections, such as *Pseudomonas fluorescens*, that lead to rotting fins, unicellular parasites, Some worm parasites such as Eustrongylides.

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