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Review Article

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Viral Diseases Infecting Finfishes and Ornamental Fishes: A Review of Relevance to Sustainable Aquaculture

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ABSTRACT

The viruses affecting the fishes grow at lower temperatures and have specific tolerance to temperature. Most of the viral diseases affecting the fishes are geographically limited. In most of the viral infections, it causes high mortality in fishlings but adults become carrier to these viruses. For this reason, SPF recommenced fish stocks are advocated for sustainable fish farming and aquaculture.

Key words: *Aquaculture, Carp, Diseases, Fish, Virus*

INTRODUCTION

The vaccines for controlling viral diseases infecting the fishes have limited application and effectiveness. Proper management, biosecurity measures, avoidance of overpopulation in water body and temperature regulation are some of the criteria for controlling the viral diseases affecting the finfishes.[1]

Herpesviruses[2, 5-7]

Koi Herpesvirus:

Koi herpesvirus (KHV), caused by Cyprinid herpesvirus-3 (CyHV-3), was first recognized in 1996. The disease is endemic in USA. It affects the koi and common carp fishes. Clinical disease is seen at water temperatures of 22°–25.5°C. Mortality rates can reach up to 80–100%. The mortality rate due to this virus is more in young fishes and gills are affected which become mottled red and white appearance with hemorrhage in some cases. Affected fish become lethargic, swim at the surface and may show behavioral signs of respiratory distress. Exposure to carrier or infected fishes spreads the disease in healthy ones. Also, contaminated surroundings and water help in transmission of the virus. Generally, depopulation of the entire stock is advised in this virus infection, as the fishes which may survive become carriers of the virus.

Carp Pox:

It is caused by Cyprinid herpesvirus-1 (CyHV-1). It is sometimes referred to as Fish pox. Smooth and raised lesions are formed on the epidermis which gives a milky appearance.

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These are benign and non-necrotizing in nature and resemble epidermal hyperplasia. The lesions are papillomatous in nature and many a times secondary bacterial infections are also evident. The lesions are self-limiting with least clinical significance. The disease mostly affects the koi carp.

Angelfish Herpesvirus:

Angelfish (*Pterophyllum* spp.) becomes infected by herpesvirus. Affected fishes exhibit grey body sheen and produce copious amounts of skin mucus. Often, these fish have multiple parasitic infestations and bacterial infections, similar to that of KHV in koi. The fishes which survive become lifelong carriers of the virus.

Herpesviral Hematopoietic Necrosis:

This condition is caused by Cyprinid herpesvirus-2 (CyHV-2) in goldfish. The clinically affected goldfishes become anorectic and exhibit pale gills and ascites. At necropsy, the spleen and kidneys (anterior and posterior) are often enlarged. Water temperature between 10° to 22°C helps in the virus multiplication.

Rhabdoviruses[3, 5-7]

Spring Viremia of Carp (SVC):

The disease is acute, virulent and usually hemorrhagic disease of cultured carp is caused by a *Vesiculovirus* which belongs to the *Rhabdoviridae* family. The disease occurs in both wild fish and cultured ornamental koi. It causes disease in common carp, including koi, as well as silver, grass, big head and crucian carp.

Non-specific clinical signs are produced and include darkening of the skin, pale gills, hemorrhage, exophthalmia and ascites. Coinfection with *Aeromonas* is also evident. The disease causes death in both adult and young fish. Clinical disease occurs at cool temperatures, 54°–72°F (12°–22°C), an important distinction from KHV. The virus is readily isolated in common fish cell lines and detected by FAT and SNT.

Viral Hemorrhagic Septicemia (VHS):

VHS is caused by a *Novirhabdovirus* and is a member of the family *Rhabdoviridae*. Koi can be experimentally infected with this virus and ornamental fishes are seldom infected.

Iridoviruses[8-13]

Megalocytiviruses:

It consists of two major groupings, red sea bream iridovirus (RSIV) and infectious spleen and kidney necrosis virus (ISKNV).

A megalocytivirus has been described in freshwater angelfish (*Pterophyllum scalare*). It causes high mortality. An iridovirus under the genus *Trichogaster* can be isolated by using a tilapia heart cell line. The virus does not grow on FHM cells or other common cell lines used for isolation of fish viruses. The gourami virus has been associated with systemic disease and mortality of *T. trichopterus* and *T. leeri* gourami.

Lymphocystis disease[14,15]**:**

It is a chronic, viral infection of ornamental and freshwater fishes which is caused by viruses belonging to the *Iridoviridae* family. Clinical symptoms include benign, cauliflower-like lesions typically on the fins. It infects marine tropical fishes such as the anemone fishes (*Pomacentridae*), marine angels (*Pomacanthidae*), and butterfly fishes (*Chaetodontidae*). Presence of enlarged fibroblasts (up to 1 mm) is easily visualized with a light microscope. Microscopic examination typically reveals the appearance of grape-like clusters of virus-laden cells.

OTHER INFECTING VIRUSES

Koi sleepy disease is also known as carp edema virus which is caused by a poxvirus which was isolated in Japan in 1974. The affected fishes float on water and resemble thin body condition. Histologically, gill hyperplasia is a common finding.

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