

Affects all varieties of common carp *Cyprinus carpio*, including varieties such as, koi, and ghost koi mirror and leather

Outbreaks occur between 15°C and 28°C

Can cause serious economic losses in ornamental and coarse fish

No treatment

Notifiable disease in the UK

Large scale mortalities up to 100%

Clinical signs include lethargic or erratic behaviour, loss of balance, loss of mucus resulting in dry, rough patches, sloughing of mucus, and sunken eyes. Gills are most frequently affected displaying necrotic patches of dead tissue, often with secondary infection of bacteria and fungi



Clinical signs of KHV in common carp

# Koi Herpesvirus (KHV) Disease: Garden Ponds and Aquaria

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## Introduction

Koi Herpesvirus (KHV) Disease is a viral disease of common carp *Cyprinus carpio*, including all its ornamental varieties such as koi, ghost koi, leather etc. The virus is highly contagious and may cause up to 100% mortality. KHV has already caused severe fish losses to ornamental wholesalers, retailers, hobbyists and carp fishery owners and continues to pose a significant threat to anyone dealing with or keeping common carp.

Etiological agent: Koi Herpesvirus (Cyprinid herpesvirus III) of the family Herpesviridae.

## Geographical distribution

KHV Disease was first recorded in Israel in 1998 following large-scale mortalities in farmed fish. Further losses attributed to the virus were later found in Europe and the USA and have subsequently been reported throughout the world including Japan, Malaysia and South Africa. The virus was first identified in the UK in 2000 and has subsequently proven to be widely distributed in ornamental dealers and hobbyists fish stocks.

## Treatment and control

There is no treatment for KHV and any fish that recover from the disease may carry the virus and act as a source of infection. In 2007 the Diseases of Fish (England and Wales) Order 2007 came into effect adding KHV Disease to the list of notifiable diseases.

As a notifiable disease there is a legal obligation to report any suspicion of a clinical outbreak of Koi Herpesvirus Disease to the Fish Health Inspectorate (FHI). If the disease is found to be present the FHI will advise on the most appropriate methods of control.

## Susceptible species



Sunken eyes in carp (left) infected with KHV Disease

Currently, KHV infections have only been recorded in common carp *Cyprinus carpio* and its varieties (koi, ghost koi, mirror, leather etc).

## Epizootiology and clinical signs

The disease occurs at water temperatures between 15°C and 28°C. Within this temperature range acute mortalities are often observed. Mortalities are often highest at the mid-temperature range. There are a variety of clinical signs associated with KHV disease; infected fish may be lethargic and move away from the shoal. They may display erratic behaviour, often gathering at water inlets or points of oxygenation, show loss of balance, loss of mucus resulting in dry, rough patches, sloughing of mucus and sunken eyes. The gills are frequently affected displaying necrotic patches of dead tissue. In addition to the clinical signs of the disease the effects of secondary infection by bacteria and fungi further complicate diagnosis.

The disease is primarily transmitted by fish to fish contact. It is also possible that the disease can spread through

contaminated water, nets and other equipment. Transmission of the virus through ova cannot be ruled out. The virus is thought to be shed through faeces, urine and also possibly via gills and skin. KHV may have the capacity to remain latent in its host for long periods of time before becoming active, stress is often a contributory factor in outbreaks of the disease.

It is in the interests of owners and keepers of fish to ensure that the animals in their care are kept according to good husbandry practices.

Please note: The Animal Welfare Act 2006 makes owners and keepers responsible for ensuring that the welfare needs of their animals, including fish, are met. This includes protecting them from disease.

## Advice and management of KHV disease

On confirmation of KHV disease you may choose to cull any varieties of common carp, *Cyprinus carpio*, including varieties such as koi, ghost koi, mirror and leather that have survived the outbreak and disinfect your pond or tanks (consult your vet for suitable humane methods of culling your fish). The pond, tanks and associated filters, pipe work and ancillary equipment should be drained and cleaned of all organic material using a biodegradable detergent, and disinfected using a proprietary disinfectant suitable for the purpose (such as Virkon S), following the manufacturers recommended safety guidelines. Dry and fallow ponds for as long as possible. We recommend a minimum of one month before restocking.

Should you be unwilling to cull the surviving fish, you may wish to consider maintaining the pond at ambient water temperatures and over wintering the remaining stock before any new fish are introduced. It is important to note that there will be a possibility that the original fish stock may still be carrying the virus, even though they show no clinical signs of disease, and may act as a source of further infection. Therefore any surviving fish should not be moved to other holding facilities and never released into any other waters such as lakes, rivers etc.