



# KHV

## Impacts, consequences and the future

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# Where did the story start?

~~1998~~

~~1996~~

1994?

~~Pre 1994~~



# Where did KHV come from?

Israel?

UK?

Eastern Europe?

Or ???



# Where did KHV come from?

**Transport from marine environment?**

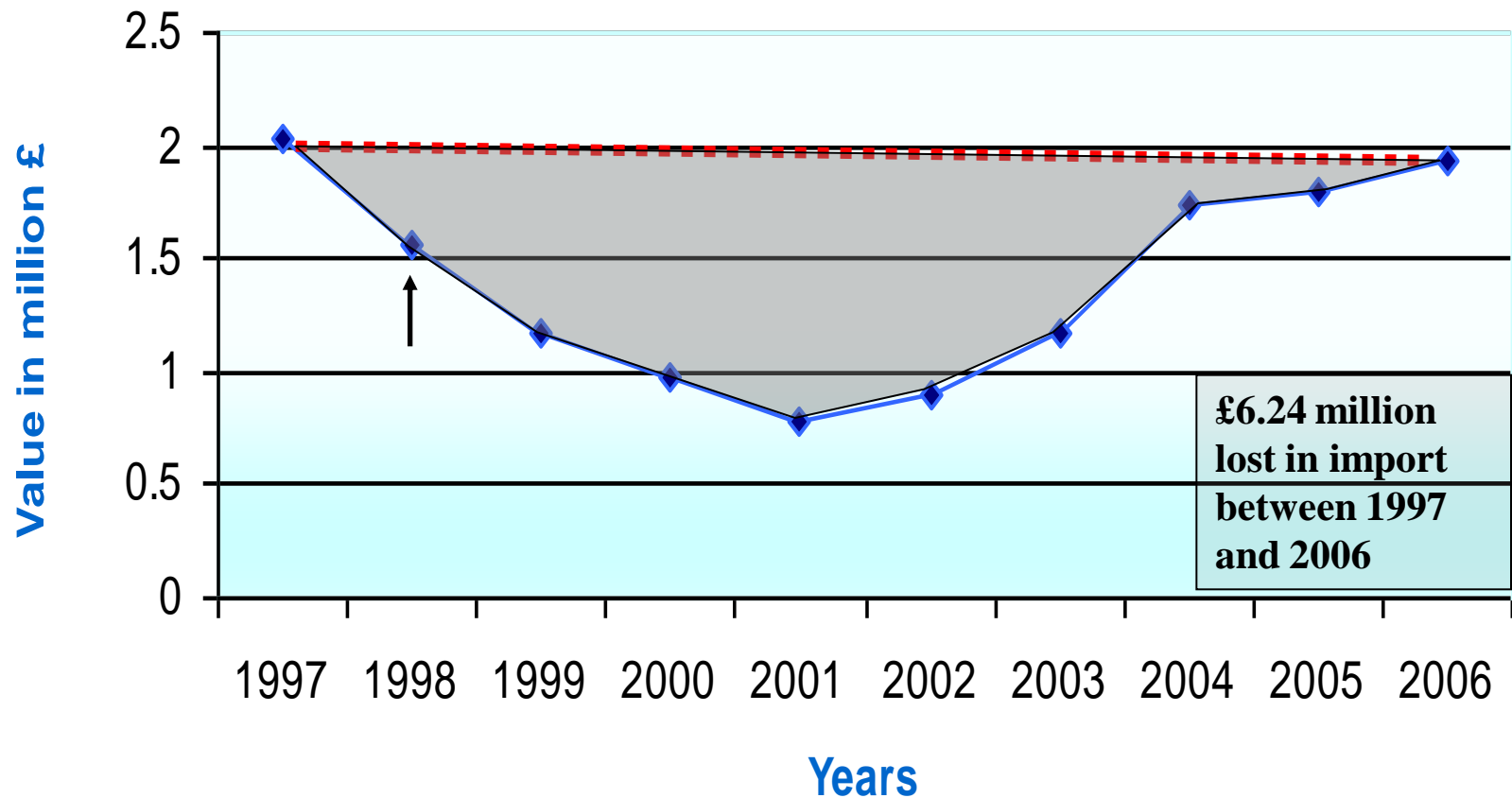
**Species jump between freshwater species?**

**Or ????**

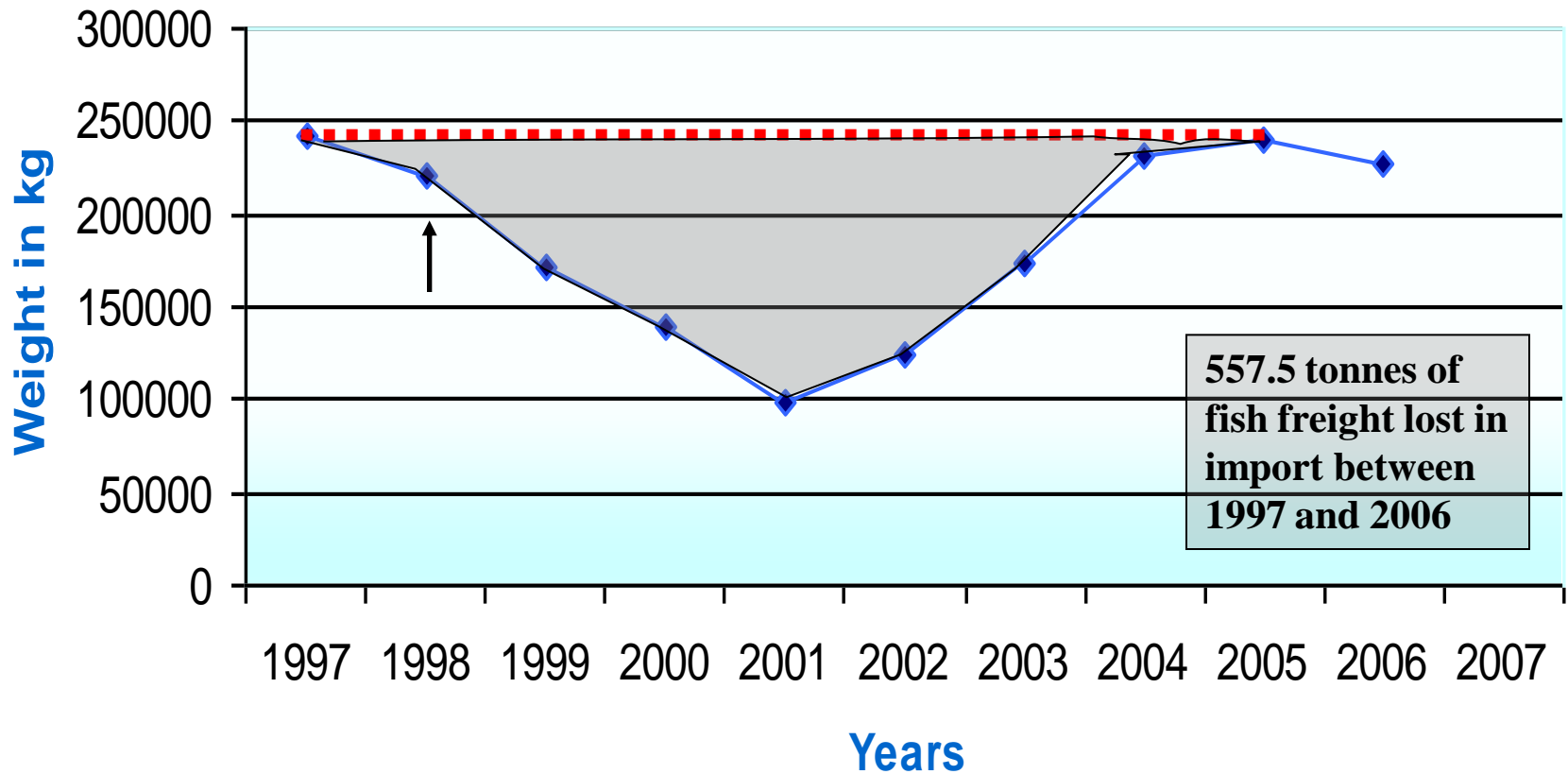


# IMPACTS

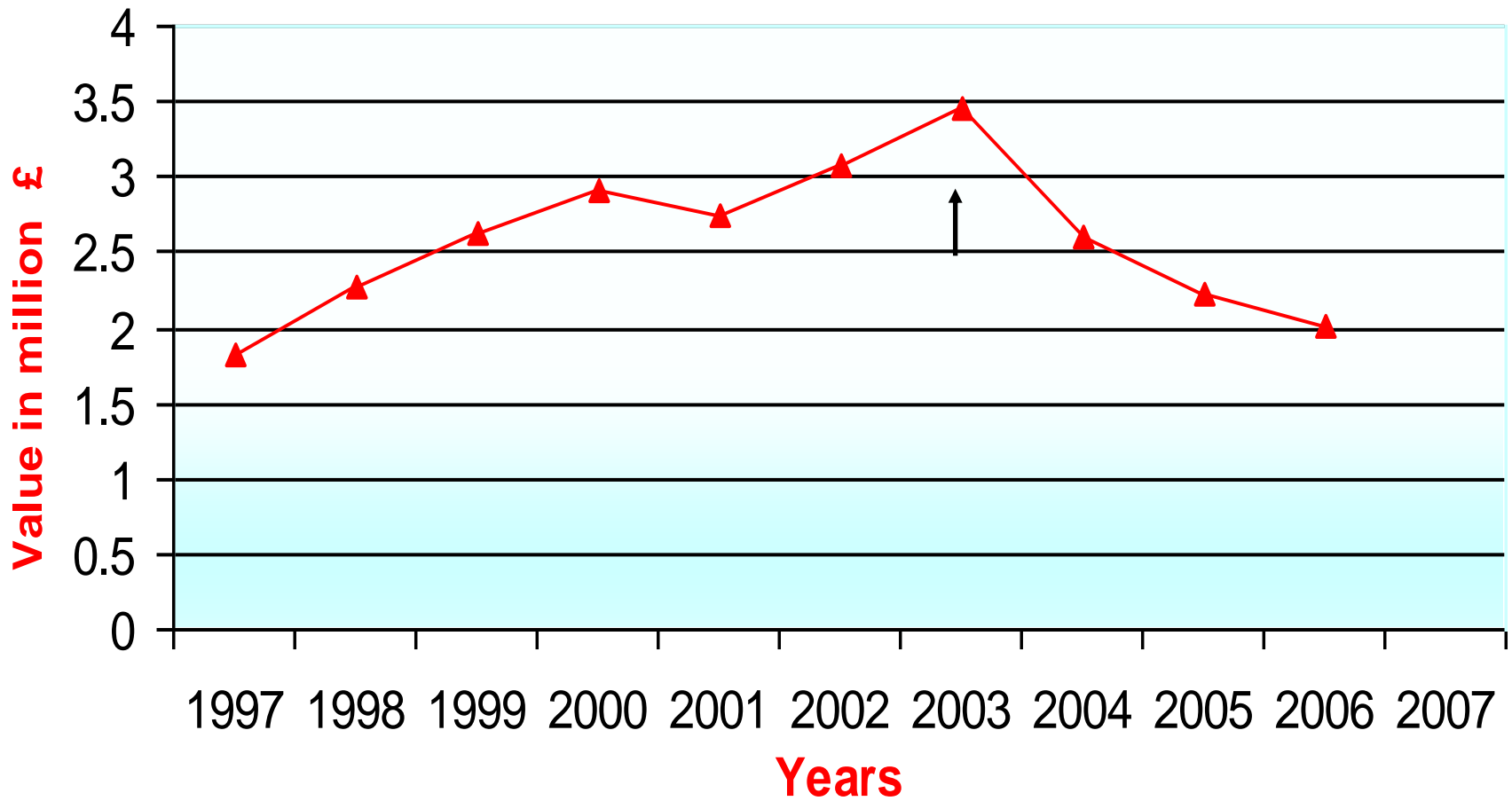
## Import into UK from Israel in terms of value



## Import into UK from Israel in terms of weight (kg)

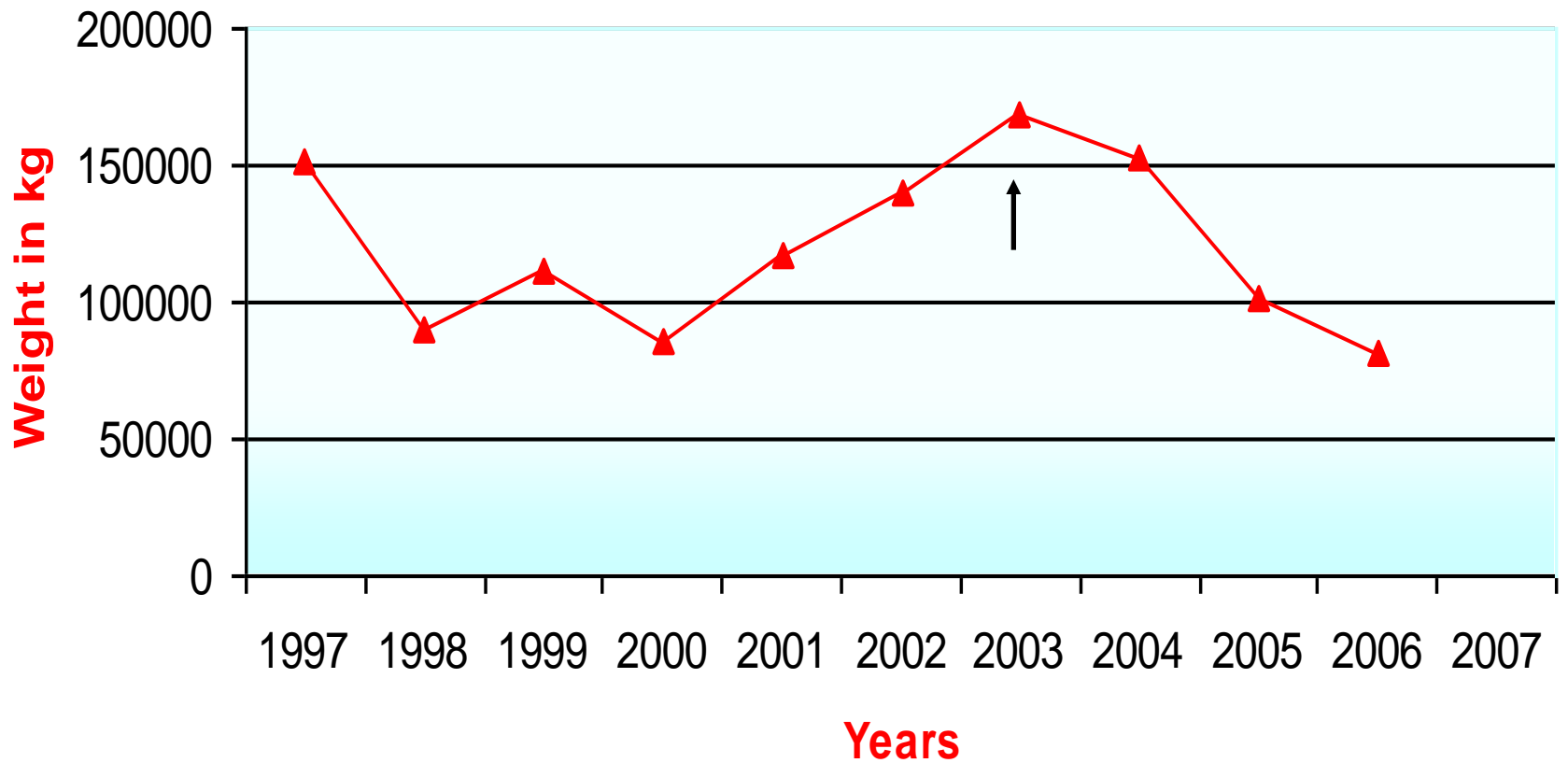


## Import into UK from Japan in terms of value

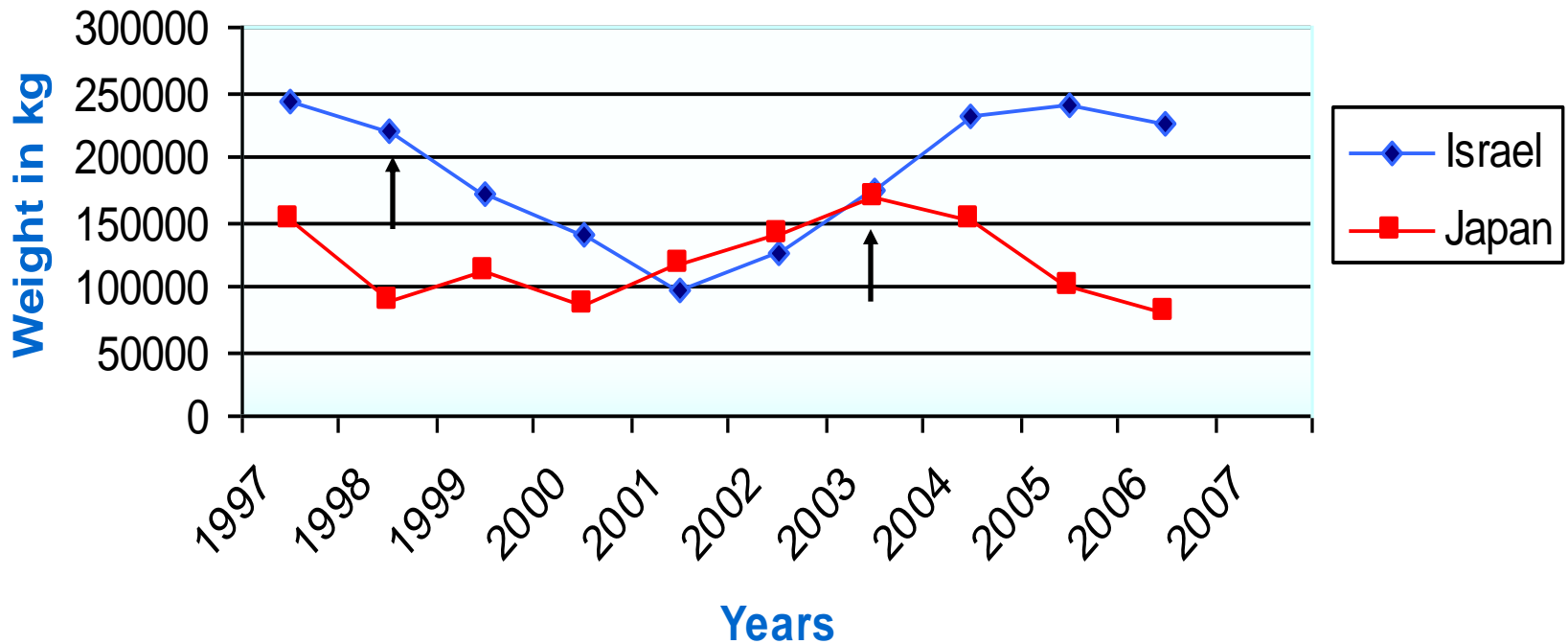




## Import into UK from Japan in terms of weight (kg)



## Comparison of imports into UK from **Israel** and **Japan** in terms of weight (kg)





# **Outbreaks in farmed fish for instance in Israel, Indonesia & Japan**

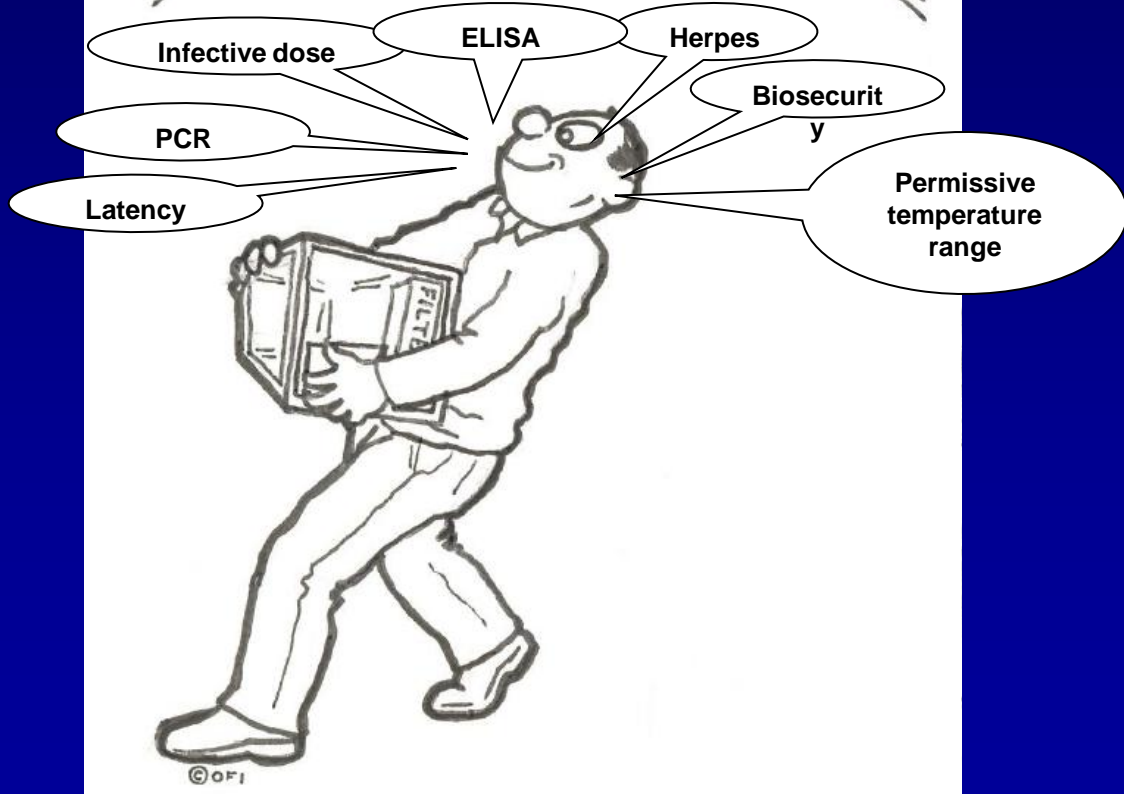


**Outbreaks of disease in wild  
populations  
for instance in  
Japan and UK**



# CONSEQUENCES







# Industry Initiatives





# KHV Document 2001

Ornamental Aquatic Trade Association (OATA)



## **KOI HERPES VIRUS (KHV)**

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# “Avoiding KHV” 2007



## AVOIDING KHV

### WHAT IS KHV?

KHV is an abbreviation for Koi Herpes Virus. KHV is highly infectious and since 1998 has spread rapidly in to countries on at least four continents. During 2006 it was found on 23 fisheries in the UK.

It causes very high mortalities among diseased populations of carp (*Cyprinus carpio*) of any variety – common, ghost or Koi, but not any other species. (more background information is available on pages 3 and 4).

KHV became a notifiable disease in England and Wales on 6<sup>th</sup> April 2007. This means that there is a legal obligation to report it to the authorities when its presence on a site is suspected or confirmed.

It is probably wise to assume any site in the world producing carp might be infected unless they can provide evidence that they are not.

### WHAT ARE THE SIGNS OF KHV I WILL SEE?

KHV should be considered as a potential culprit (not the culprit) if:

- Only Carp (*Cyprinus carpio*) including koi, ghosts and common varieties are affected and killed. If other species such as goldfish and grass carp in the same system remain unaffected even if diseased carp are present, then the presence of KHV may be suspected.
- Mortalities occur at water temperatures between 15° and 28° C. If during an outbreak the temperature rises above or falls below this range mortalities may diminish or stop.
- Mortalities are very rapid. Seemingly healthy fish become ill and die in 24-48 hours.
- Very severe mortalities 80-100% mortalities occur within 10 days of disease outbreak.
- Bleeding from the gills (that may also release virus and part account for its' infectious nature).
- White patches, (where excess mucus has been produced or tissue has died) which may be small to very extensive, on the gills or skin.
- Sunken eyes.
- Occasionally fish have shown signs of nervous problems (that is periods of inactivity followed by hyperactive behaviour triggered by a very small stimulant).

The Koi Herpes Virus can suppress a fishes immune system. The body can't then react as it would normally to prevent infections. Thus secondary invasions on bacteria and parasites might be the most obvious problem on an individual fish, but these signs may obscure the damage caused by the virus.

**None of these visual techniques can identify KHV directly but they give very strong indications of its presence. Laboratory tests are used to confirm the presence of KHV (more details page 4).**

Are there  
any more  
bad guys  
out there?





# Biosecurity Document 2006

## BIOSECURITY AND THE ORNAMENTAL FISH INDUSTRY

“FUTURE PROOFING THE INDUSTRY”



ORNAMENTAL AQUATIC TRADE ASSOCIATION (OATA)



FISHERIES RESEARCH SERVICES

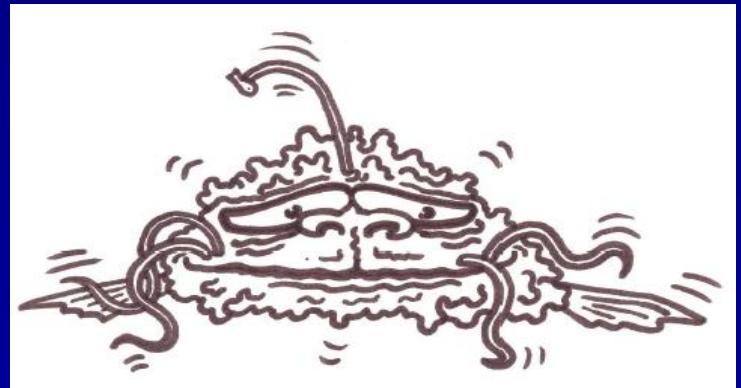
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# Government initiatives

# Emerging diseases “measures”

**Specific measures and contingency plans to deal with the unknown.**





## **KHV made notifiable by the:**

- **OIE**
- **EU**
- **and individual countries,  
e.g. UK**



# Scientific initiatives







**Detection methods**

**Infective doses**

**Susceptible species**

**Transmission routes**





# Vaccines



# THE FUTURE



# UK KHV Status



**If the UK (or any part of the EU)  
is declared a:**

- Surveillance**
- Eradication**
- Uninfected zone**



# Restrictions on imports

~~Vaccination~~





**If the UK is declared infected:**

**No restriction on imports**



**The market will then decide  
between:**

- **Vaccinated stock**
- **Disease free stock**



**Key areas that need practical output from research -**

**or better still an answer during the two days of this conference.**



## **Detection kits that are:**

- accurate**
- inexpensive**
- readily available**
- easy to use on farm (or in retail)**



**A definitive answer to  
whether or not species other  
than *Cyprinus carpio* are  
susceptible to and/or can  
carry KHV**



**Does KHV really become  
latent?**



**A definitive answer to where  
in the fishes body the virus  
“hides” when latent**



# **How many strains of KHV are there?**

**Are they all of equal significance in terms  
of economic threat?**

**Can they be distinguished from one  
another by tests??**





**If more than one strain  
exists do vaccines have to  
be multivalent?**



**Can vaccination mask carrier status?**



**Is the “permissive temperature”  
window widening?**



**Can KHV enter a koi at high temperatures or low temperatures and become latent before an immune response is triggered and antibodies detectable by ELISA are produced?**



**With current techniques  
how will zoning and  
compartmentalization be  
achieved?**



**Will KHV persist in wild  
populations of fish?**



**Where did KHV come  
from?**



**A major  
positive?**





**The co-operation and  
collaboration between  
industry  
government agencies  
scientists**



## **Business have chosen**

- either a strict disease free regime**
- disease free regime based on regular testing only**
- vaccination**