



## **P-001: Koi herpes virus world wide: results of the global KHV questionnaire 2007-2009**

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# Results of global koi herpesvirus questionnaire 2009

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## Introduction

Koi Herpes Virus (KHV) causes significant disease and mortalities in *Cyprinus carpio* L. (carp and koi). KHV is notifiable for the OIE, and since Aug 2008 also for the EC. KHV has been present at least since 1996 in Europe. As a follow up of previous updates on KHV in Europe (NRL Annual meeting for Fish Diseases, May 2006) and on the global KHV situation 2006-2007 (EAFF poster Grado, Sept 2007), in spring 2009, a questionnaire was sent to fish disease laboratories in 73 countries by e-mail. Data from the answers of this and the previous questionnaire are presented below. This work was supported by EPIZONE (Contract No. FOOD-CT-2006-016236).

## Results & Discussion

**Response questionnaire:** From e-mails to 73 countries 8 e-mails were rejected: 65 countries received the questionnaire. By July 2009, 48 countries replied with data: Response 74%.

**Global occurrence of KHV** (Figure 1):

**Positive:** KHV has been detected in 30 countries  
(\* = in closed systems; # = in wild carp):

Austria\*, Belgium\*, Canada#, China\*, Costa Rica\*, Czech Republic\*, Denmark\*, France\*, Germany\*#, Hong Kong\*, Indonesia\*#, Ireland\*, Israel\*, Italy\*, Japan\*#, Luxembourg\*, Malaysia\*, the Netherlands\*, New Zealand\*, Poland\*#, Singapore\*, Slovenia\*, S-Africa\*, S-Korea\*, Sweden\*, Switzerland\*, Taiwan\*, Thailand\*, UK\*#, and USA\*#.

**Suspicion of KHV:** 3 countries: India\*, Guatemala\*, Russia\*

**KHV negative** or never detected KHV: 28 countries:

Albania, Argentina, Australia, Bosnia Herzegovina, Bulgaria, Croatia, Cyprus, Estonia, Faroe Islands, Finland, Greece, Hungary, Iceland, Kosovo, Latvia, Lithuania, Macedonia, Mexico, Montenegro, Norway, Philippines, Portugal, Romania, Serbia, Slovakia, Spain, Turkey and Ukraine.

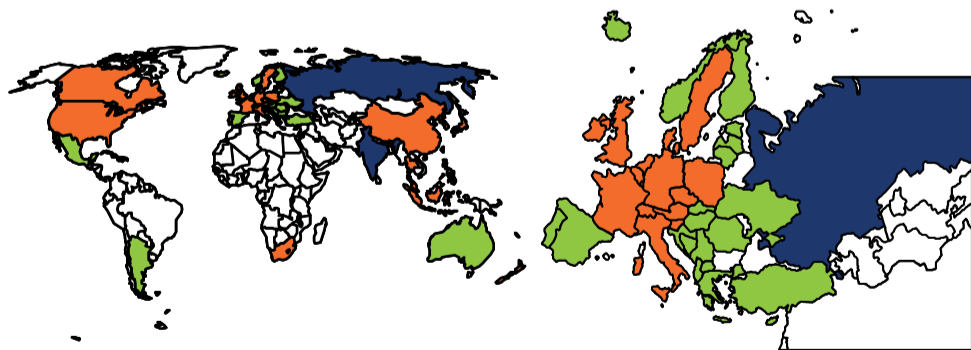


Fig. 1. Overview of global spread of KHV, and spread in Europe, per country (■ positive, ■ suspicion and ■ negative).

**Origin of host:** In 24 countries KHV was found in koi, in 12 in cultured carp, and in 5 in wild carp. KHV was reported in *C. carpio* of all ages. The mortalities varied: in koi 10-100%, cultured carp <10%-100%. In wild carp mortalities were often high but unknown.

**Maximum reported number of outbreaks:**

2007: koi 209 (Germany), cultured carp: 22 (Germany), wild carp: 19 (Japan).  
2008: koi 142 (Germany), cultured carp 31 (Germany), wild carp 28 (Japan).  
2009: 5 (Netherlands), cultured and wild carp: no data yet.

**Diagnostic and proficiency testing:** Clinical pathology was often the basis of diagnosis. For confirmation 37 countries used a PCR based method for diagnosis, mostly the conventional PCR, but also 2x nested PCR, and > 11x real time PCR. In addition 17 laboratories used virus isolation, of which 4 only, 1 used IFAT, 1 ISH, and 1 histopathology. In 4 laboratories an ELISA for detection of anti-KHV antibodies was used. Of the responding countries 13 reported to have no KHV tests running (yet). 29 countries participated in the 2008 KHV PCR inter-laboratory proficiency test by CEFAS (UK), and additional 16 labs showed interest in participating.

**Measures taken:** In 14 countries, stamping out was done, with disinfection. Further measures: stop fish movements, water temperature raised to 28-30°C, and/or vaccination.

**Vaccination:** In Israel an attenuated live vaccine is used. Many vaccinated koi are imported into the EU from Israel. Also Hong Kong, Kosovo and the USA reported the use of a KHV vaccine.

**Research:** Among >18 countries with research initiatives taken are studies on epidemiology; Assessment of impact on wild and fishery carp (UK); diagnostics/strains (>10 countries); relation of KHV with CyHV-1 and -2 (USA); Vaccination (Germany, Israel, USA), Latency (Ireland, Poland); Susceptibility of other animal species to KHV (Czech Rep, Poland); KHV for biological control of carp (Australia).

**National legislation:** National legislation on KHV is present in 31 countries. In most cases measures are voluntary.

**Gaps reported:** 1) International training on diagnostics of KHV, 2) Others susceptible than koi or carp? 3) Safe vaccine? 4) Info on control of KHVD.

## Conclusion

KHV is slowly further spreading over the world. During the recent 2 years, the use of various validated PCR tests has increased, and in many countries KHVD has become notifiable. Serology as monitoring tool is in focus.

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