Emergence of carp edema virus (CEV) and its significance to European common carp and koi Cyprinus carpio

Carp edema virus disease (CEVD), also known as koi sleepy disease, is caused by a poxvirus associated with outbreaks of clinical disease in koi and common carp *Cyprinus carpio*. Originally characterised in Japan in the 1970s, international trade in koi has led to the spread of CEV, although the first recognised outbreak of the disease outside of Japan was not reported until 1996 in the USA. In Europe, the disease was first recognised in 2009 and, as detection and diagnosis have improved, more EU member states have reported CEV associated with disease outbreaks. Although the structure of the CEV genome is not yet elucidated, molecular epidemiology studies have suggested distinct geographical populations of CEV infecting both koi and common carp. Detection and identification of cases of CEVD in common carp were unreliable using the original PCR primers. New primers for conventional and quantitative PCR (qPCR) have been designed that improve detection, and their sequences are provided in this paper. The qPCR primers have successfully detected CEV DNA in archive material from investigations of unexplained carp mortalities conducted > 15 yr ago. Improvement in disease management and control is possible, and the principles of biosecurity, good health management and disease surveillance, applied to koi herpesvirus disease, can be equally applied to CEVD. However, further research studies are needed to fill the knowledge gaps in the disease pathogenesis and epidemiology that, currently, prevent an accurate assessment of the likely impact of CEVD on European koi and common carp aquaculture and on wild carp stocks.

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