coupled receptor (GPCR) gene; ORF134: putative Interleukin 10 homologue gene; ORF140: putative thymidylate kinase gene, or combinations thereof. Such mutants were used as live attenuated vaccine viruses.

It was shown that some of these mutants were safe when used in specific SPF fish of a certain size and age. However, in the field, fish farmers are interested in early vaccination, i.e. when the fish are relatively young/small and where there exists a relatively large spreading in size of the fish. It turned out that in such conditions vaccines based upon the deletion mutant viruses as disclosed in International Patent Application WO2009/027412 may in some situations not be sufficiently safe: such recombinant KHV are too virulent for use in young/small fish.

This means that at present, there still is a lack of safe and efficacious attenuated recombinant vaccines for the control of the disease in field situations such as in fish farming.

It is an object of the ~~present invention~~embodiments disclosed herein to provide novel recombinant KHV viruses that can be used for the development of safe and efficacious attenuated vaccines to control KHV infection in the field.

In a first aspect, there is provided a live recombinant Koi herpesvirus (KHV) in which Open Reading Frame 57 (ORF57) is deficient, resulting in a live recombinant KHV which is attenuated.

In a second aspect, there is provided a cell comprising the recombinant Koi herpesvirus as disclosed herein.

In a third aspect, there is provided a method for the production of infectious particles of recombinant Koi herpesvirus (KHV), wherein said method comprises the steps of

(a) introducing a live recombinant KHV as disclosed herein or a recombinant KHV DNA comprising the genome of a recombinant Koi herpesvirus as disclosed herein into permissive eukaryotic cells; and

(b) culturing said cell to produce recombinant Koi herpesvirus (KHV).

In a fourth aspect, there is provided a live recombinant Koi herpesvirus as disclosed herein and/or a recombinant KHV DNA comprising the genome of a recombinant Koi herpesvirus as disclosed

herein, for use in a vaccine for the prevention and/or therapeutic treatment of a disease in fish caused by Koi herpesvirus (KHV).

In a fifth aspect, there is provided a vaccine for the prevention and/or therapeutic treatment of a disease in fish caused by Koi herpesvirus (KHV), characterised in that said vaccine comprises a live recombinant Koi herpesvirus as disclosed herein and/or a recombinant KHV DNA comprising the genome of the recombinant Koi herpesvirus as disclosed herein, and a pharmaceutically acceptable carrier.

In a sixth aspect, there is provided a vaccine for the prevention and/or therapeutic treatment of a disease in fish caused by rhabdovirus causing carp spring viraemia, characterised in that said vaccine comprises a live recombinant Koi herpesvirus as disclosed herein and/or a recombinant KHV DNA comprising the genome of the recombinant Koi herpesvirus as disclosed herein, and a pharmaceutically acceptable carrier

It was surprisingly found now that a recombinant KHV in which the Open Reading Frame 57 (ORF57) is deficient, shows a strongly reduced or no mortality at all, even in very young/small carp infected with this herpesvirus recombinant and provides immunity against wild-type Koi herpesvirus. Such a recombinant KHV thus provides a safe and efficacious attenuated vaccine virus that can suitably be used in young and/or small carp.
This finding is even more surprising in view of the fact that ORF57 was up till now thought to be an essential gene, without which no live virus would be feasible.
Therefore, a first embodiment of the present invention relates to a recombinant Koi herpesvirus in which ORF57 is deficient, resulting in a KHV which is attenuated and induces a mortality rate of 40% or less in carp, preferably *Cyprinus carpio carpio* or *Cyprinus carpio koi*, when infected with said herpesvirus.

As used herein, a "deficient" ORF57 is an ORF57 that is no longer functional, i.e. no longer capable of encoding a functional protein. A deficient ORF57 as used herein, results in a KHV which is attenuated to the level that it induces a mortality rate of 40% or less in carp. Such a deficiency can e.g. be obtained by mutation such as insertion or deletion of one or more