Carp herpesvirus as a biological control for carp

Introduction:
Carp (Cyprinus carpio) are not native to Australia, but they now dominate fish communities throughout many inland waterways. Widespread eradication of these established populations would be difficult, costly and complicated. Recently, cyprinid herpesvirus 3, commonly known as the carp herpesvirus (CyHV-3), has been proposed as a potential biological control method for carp in Australia. It has the potential to substantially reduce Australian carp populations, with impacts likely to be increased when used in an integrated carp management control program.

About CyHV-3:
CyHV-3 is highly specific to common carp and its ornamental variety, koi (both C. carpio), and only causes death in this species. While carp-goldfish hybrids may also be infected with the virus, they are much less susceptible to CyHV-3 than pure carp. No other fish species are known to be infected, let alone affected, not even other cyprinids (such as goldfish). Australia has no native cyprinid fish species. There are many known herpesviruses in other species, but these are generally specific for one host alone. While humans are known to be infected by eight different human herpesviruses, CyHV-3 does not affect humans.

Recent research:
The use of CyHV-3 as a potential carp biological control agent continues to be assessed by researchers at CSIRO’s Australian Animal Health Laboratory. Past funding from the Invasive Animals Cooperative Research Centre revealed that:

• CyHV-3 is lethal to carp in Australia
• CyHV-3 does not threaten Australian native species (13 native fish species have been tested, along with rainbow trout, and a variety of other animals that might live in, or drink, virus-infected water. None of these animals are infected, let alone affected, by the virus).
• CyHV-3 acts on all sizes of carp (although it is known that young carp are extremely sensitive to the virus)
• Water temperature is critically important to the potency of the virus
• While the closely related virus cyprinid herpesvirus 1 (CyHV-1) is known to be present in Australia, it probably has a minor, if any, role in protecting carp from infection with CyHV-3
• A mathematical model to assist in optimal release of CyHV-3 is feasible.
Planning for CyHV-3 release:

CyHV-3 has the potential to be an effective biological control agent for carp. However, before CyHV-3 can be released it must go through a formal evaluation process coordinated by the Australian Pesticides and Veterinary Medicines Authority (APVMA). This will require more detailed scientific assessment and the development of a release and monitoring strategy. Beginning July 2017, the National Carp Control Plan (NCCP) is funding CSIRO research with a number of objectives:

- Test the susceptibility of a few final native species of fish, and Atlantic salmon, to CyHV-3
- Develop methods to monitor the spread of the virus if it is eventually released into natural waterways
- Determine if there are strain differences in carp throughout the Murray-Darling Basin, and if there are other carp viruses that could recombine with CyHV-3
- Determine the stability of CyHV-3 in estuarine and marine waters
- Compare the stress response in virus-infected carp with the stress induced by low oxygen or crowding
- Finalize the mathematical model for virus release in order to take advantage of known vulnerabilities of carp. For example, the onset of the disease is related to temperature and to stress levels in the fish, so it will be important to choose the right time and the right site for release of the virus. Fish massing in large numbers for spawning would be an ideal target for the virus.
- Conduct a risk assessment for the release of CyHV-3

The NCCP is also funding many other projects.

Further information:


