The Problem With Carp

Setting the scene

In the past, little attention was paid to the biology of a pest animal. As a result many pest management strategies were unsuccessful in maintaining acceptably low numbers of pests and were often economically unsustainable. It is now well known that effective and efficient pest control requires a thorough understanding of the biology and ecology of the pest. Knowledge of a pest's diet, reproduction and habitat preference all assist in its control.

What to do

Know your pest.

Research the biology and ecology of European carp.

Produce a 600 word essay by reporting on the following traits of carp:

- general description of European carp
- life cycle
- reproduction abilities
- sexual maturity of female carp
- age and rate of growth
- distribution and abundance
- migration abilities
- feeding activity and diet
- habitat requirements
- environmental tolerances
  - temperature
  - salinity
  - pollution
- describe the type of river disturbances that have favoured invasion by carp
- perceived affects and interactions with native fish species
- carp mortality (predators, fishing, diseases and parasites)
- the type of diseases carp can carry
- common view points and public perceptions of carp

Review the following control methods for carp.

Current control methods for carp include:

Capture and removal

The removal of carp can be achieved through both commercial and recreational fishing as well as dedicated harvesting and removal operations. Researchers sometimes use electrofishing as a means to remove carp. Electrofishing uses an electric current in the water which attracts and immobilises fish for easy removal from the water.

Environmental rehabilitation

The restoring of aquatic ecosystems may allow for the indirect control of carp numbers. Undisturbed habitats with healthy native fish populations are more resilient to invasive species such as carp.

Environmental manipulation

Complete removal of carp can be achieved by draining isolated habitats such as billabongs, creeks, irrigation channels and floodplains connected to major river systems. Native fish will often migrate to deeper waters as surrounding waters recede. Carp appear to not have the ability to detect lowering water levels and will stay in a creek or billabong as the area is drained of water.

Chemicals

Chemical poisons can control carp but are only successful in isolated waterholes where native fish are not present. Better knowledge about carp biology may enable scientists to develop a chemical that can poison carp without harming other fish.

Exclusion devices

Carp exclusion devices are intended to prevent carp from establishing in areas where they do not exist or where they have been successfully removed. Barriers in the form of large screens are often used to prevent the movement of large fish but it is often difficult to prevent the movement of eggs and juvenile fish through the screen.

Fishways

A fishway is a structure built along side a weir or lock which allows fish to travel upstream - something they would not normally be able to do when approaching an artificial barrier located in a river system. A wide variety of fish use fishways including introduced pests such as carp. To reduce the movement of carp some fishways are installed with a carp separation cage. Carp will often attempt to jump over a barrier whereas native fish do not. The cage encourages carp to jump over a wall into a separate trap complete with hinged lid so the carp can not jump out again. The trap is monitored regularly and the carp removed.

Future control methods for carp currently being considered are:

Biological control — virus

Scientists are currently investigating a virus, which has recently emerged overseas, that causes death in European carp. The virus works by attacking the gills and other vital organs of the carp eventually killing it. Secure testing of the virus is occurring in Australia to ensure native fish species are not affected.

Biological control — daughterless carp

Daughterless control in carp is currently being researched by scientists in Australia. It involves modifying a specific gene responsible for determining the gender of a carp. Manipulation of this gene would result in the production of male offspring only. Over time, less and less females will be available to reproduce which would eventually reduce the number of carp.

Pheromone and sensory attractants

Scientific research has identified a male sex pheromone in gold fish (a species very similar to carp) which attracts female goldfish. Scientists are keen to explore the possibility of finding a similar pheromone in male carp and replicating it in a laboratory. The artificial pheromone would be used to attract and divert female carp to a specific site for removal from river systems. Over time, less and less females will be available to reproduce which would eventually reduce the number of carp.

What to do

Using your knowledge of carp biology and control methods, design a fish trap capable of attracting and trapping carp without impacting on the native fish population.

Develop a prototype or three dimensional image of the fish trap detailing how and why it works.

Feral fact

Carp originated in China and spread throughout Asia and Europe as an ornamental and aquaculture species. Carp were released into the wild in Australia on a number of occasions in the 1800s and 1900s but did not become widespread until a release of 'Boolara' strain carp from a fish farm into the Murray River near Mildura in 1964. The spread of carp throughout the Murray-Darling Basin coincided with widespread flooding in the early 1970s, but carp were also introduced to new localities, possibly through their use as live bait.

Introduced carp are now the most abundant large freshwater fish in the Murray-Darling Basin and are the dominant species in many fish communities in south-eastern Australia. A recent NSW Rivers Survey found that carp represent more than 90% of fish biomass in some rivers and have reached densities of up to one fish per square metre of water surface. Carp have benefited from the modification of river systems, including construction of dams and other barriers to fish movement, reduced river flows and inundation of floodplains, changes which have had major detrimental impacts on native fish.

Source: www.feral.org.au