

## Carp, *Cyprinus carpio*

### Overview

#### Short description of *Cyprinus carpio*, Carp

Typically around 30cm(max 110cm). Very variable in form, proportions, scales, fin development, colour (grey to bronze). Distinguished from other cyprinids by 2 pairs of barbels, arrangement/number of fin rays, caudal fin deeply emarginate, arrangement of pharyngeal teeth. Includes koi.

#### Description of *Cyprinus carpio*, Carp status in GB

Carp is widespread throughout GB, especially southern, central and eastern England; more scattered in Wales, Scotland and northern England.

#### Habitat summary: *Cyprinus carpio*, Carp

Can tolerate a wide variety of conditions, but usually in warm, deep, slow-flowing and still waters such as lowland rivers and large, well vegetated lakes, especially with soft bottom sediments.

### Overview table

Environment:	Freshwater
Species status:	Non-Native
Native range:	Southwestern Europe, China, Afghanistan, Armenia, Austria, Azerbaijan, Bulgaria, Germany, Gruzija, Croatia, Hungary, Iran, Kirgizistan, Kazakhstan, Moldova, Pakistan, Romania, Russia Central, Russia East, Russia North, Russia Northwest, Russia South, Slovakia, Tadjhikistan, Turkmenistan, Turkey, Ukraine, Serbia
Functional type:	Omnivore
Status in England:	Non-Native
Location of first record:	London?
Date of first record:	1496

### Invasion history: *Cyprinus carpio*, Carp

#### Origin

The threatened wild population in the Danube is assumed to be the origin of the European species; wild stocks found in Europe and Asia, specifically in rivers draining into the Black, Caspian and Aral Seas. Cultivated as a food fish in China for over 3000 years, and an important source of protein for human consumption in many countries. Also bred as ornamental koi.

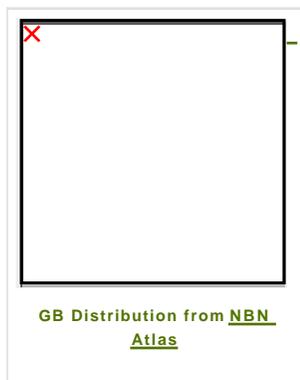
#### First Record

Introduced during the 14th or 15th centuries probably from the River Danube or from western Europe as an extension of its westward spread by man. May have also been introduced from Asia. Recorded in GB by 1496 at the latest.

#### Pathway and Method

Introduced for aquaculture as a food fish and for angling. Number and locations of introductions unknown but possibly initially in the London area. Spread by both continued introductions and by natural reproduction. Includes ornamental koi.

### Distribution map



#### Author's name:

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#### Last updated:

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We try to keep these factsheets up to date, however if you notice any issues please contact us

### Species Status

Widespread in GB, and one of the most widely introduced fish species in the world in many countries throughout Europe, Asia, Africa, the Americas and Australasia.

## Ecology & Habitat: *Cyprinus carpio*, Carp

### Dispersal Mechanisms

The dispersal of this species is very variable; in the Murray-Darling Basin in Australia some tagged fish have moved large distances (up to 890 km), however the majority remained within 5 km of the tagging site, with males moving on average twice as far as females (Jones & Stuart 2006). An ability for rapid movement (up to 0.9 km hr<sup>-1</sup>), combined with the capability of dispersal over large distances allow carp to spread widely. Adult spawning migrations of up to 230 km are known and carp are able to leap obstacles up to one metre high and negotiate torrential flows.

Local dispersal may also occur through movements associated with angling (e.g. transport and use of juveniles as bait-fish) and escapes from confinement (e.g. farm and ornamental ponds).

### Reproduction

The life-history is flexible, with long breeding seasons (up to 9 months) and the ability to spawn multiple times each year. Spawning occurs two or three times over a 14 day interval. Mating groups of one female and several males swim actively before spawning. A temperature of 18°C is required for spawning (Hickley *et al.* 2004) and the carp is not selective in its choice of substratum for attachment of eggs (Hickley *et al.* 2004), though floodplains, slow flowing pools, and other shallow habitats with dense macrophyte cover appear to be preferred sites. Males externally fertilize eggs and females spread them over aquatic plants. They spawn during spring and summer in temperate conditions and year round in tropical conditions. Eggs vary from 1.2 to 1.4 mm in diameter, are yellowish-green and usually hatch within four days (this may be two days at 25°C). They have a relative fecundity of 100,000 to 300,000 eggs per kg with reports of as many as 360,000 to 599,000 eggs per female and over a million eggs produced by a female in one season. In their native range they may reach sexual maturity within their first year, though three to four years is more common

Larval growth is very rapid, enabling them to quickly escape predation pressure (Koehn 2004). Male carp mature before female carp (Pinto *et al.* 2005) and are longer-lived; in their native range, they generally live up to 15 years, with reports of individuals living up to 24 years.

### Known Predators/Herbivores

General piscivory.

### Resistant Stages

None known.

### Habitat Occupied in GB

Hardy and tolerant of a wide variety of conditions, but usually found in warm, deep, slow-flowing and still waters such as lowland rivers and large, well vegetated lakes, especially with soft bottom sediments. Thrive in large turbid rivers. Most active at dusk and dawn. Adults and juveniles feed on various benthic organisms and plant material. Spawns along shores or in backwaters. Adults may undertake considerable spawning migration to suitable backwaters and flooded meadows. Larval survival requires shallow warm water with submerged vegetation.

## Distribution: *Cyprinus carpio*, Carp

Widespread throughout GB, especially southern, central and eastern England; more scattered in Wales, Scotland and northern England.

## Impacts: *Cyprinus carpio*, Carp

### Environmental Impact

*C. carpio* is one of the most frequently introduced species in the world and on every continent where it has been introduced it has reduced water quality and degraded aquatic habitats (e.g. Roberts *et al.* 1995). Through such habitat alteration, carp may pose a threat to wetlands that are used by other fish species as spawning and nursery habitats.

In shallow aquatic ecosystems, carp can be considered 'ecosystem engineers' or 'keystone modifiers' (e.g. Parkos *et al.* 2003) due to the strength of their effects on benthic communities. For example, carp are known to damage aquatic macrophytes which are integral to ecosystem functioning (Nunn *et al.* 2007) by reduction of light availability, increased siltation, ingestion of plant matter and uprooting during feeding activity. They have also been shown to have a significant negative impact on benthic

macroinvertebrates (Matsuzaki *et al.* 2009). Attempts have been made to model the species' ecological impact in non-native waters (Coates & Ulaiwi, 1995). It is considered doubtful whether any single management approach could eradicate established carp; thus integrated techniques may be required (Sorensen & Stacey 2004).

Carp also stimulate algal blooms by increasing nutrient release from sediments and decreasing algal grazing by cladocerans (which juvenile carp prey upon) (Pinto *et al.* 2005). Carp increase nutrient levels in the water column by both sediment resuspension (which in turn increases turbidity) and by excretion.

There is also evidence of impacts reducing native biodiversity. In California, USA, carp have been implicated in the gradual disappearance of native fishes (Nico *et al.* 2009). Carp may prey on the eggs of other fish species (e.g. Nico *et al.* 2009), and they can impact native fish species through increased competition.

*C. carpio* can hybridise with the native crucian carp *Carassius carassius*, which is likely to have a negative impact on populations of the latter (NHM 2010). Note that the hybrids remain susceptible to koi herpesvirus (KHV, syn. CyHV-3) (Bergmann *et al.* 2010).

#### **Health and Social Impact**

Possible nuisance effects; by stirring up river substrate and reducing aquatic vegetation, carp can make waterways unattractive and can render the water unsuitable for swimming.

#### **Economic Impact**

Economic benefits through aquaculture, angling and as a food fish (fresh and frozen). However, carp may impact on other economically important fish such as perch through impacts such as competition. Increased turbidity and nutrient levels (including promotion of algal blooms) may make water unsuitable for drinking by livestock.

## **References & Links: *Cyprinus carpio*, Carp**

### **Identification**

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#### **General**

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