Goldfish, *Carassius auratus*

**Overview**

**Short description of *Carassius auratus*, Goldfish**

An ornamental goldfish reverting to the 'wild' brown form. Up to 45cm & 1kg+. Deep body, rounded cross-section, large head and eyes, small mouth, forked tail, large scales.

**Description of *Carassius auratus*, Goldfish status in GB**

Populations of the ornamental goldfish are known in England and Wales, records also from Scotland (broadly the Glasgow area).

**Habitat summary: *Carassius auratus*, Goldfish**

Still and stagnant waters (ponds, lakes); also some slow-flowing river waters and ditches.

**Overview table**

<table>
<thead>
<tr>
<th>Environment:</th>
<th>Freshwater</th>
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</thead>
<tbody>
<tr>
<td>Species status:</td>
<td>Non-Native</td>
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<tr>
<td>Native range:</td>
<td>Hong Kong, Kazan-retto, Nansei-shoto, Ogasawara-shoto, Laos, Myanmar, Macau</td>
</tr>
<tr>
<td>Functional type:</td>
<td>Omnivore</td>
</tr>
<tr>
<td>Status in England:</td>
<td>Non-Native</td>
</tr>
<tr>
<td>Date of first record:</td>
<td>1694</td>
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**Invasion history: *Carassius auratus*, Goldfish**

**Origin**

Originates in Asia (central Asia, China & Japan), with many imports e.g. from China where the Goldfish (*C. a. auratus*) was bred from the Giebel or Prussian Carp (*C. a. gibelio*). This selective breeding began during the 1st century AD.

**First Record**

First release unknown, but goldfish have been brought to GB as an ornamental species since at least the 17th century.

**Pathway and Method**

A common ornamental and aquarium fish, releases of unwanted specimens are widespread in a range of waters. There may also be occasional escapes e.g. from garden ponds. Like the guppy and some other carp, goldfish are sometimes used to control mosquitoes, although this is unlikely to contribute significantly to their spread in GB.

**Species Status**

Populations exist in still or slow-flowing waters in England and Wales, with records also from Scotland, primarily around the wider Glasgow area. Established populations exist across much of Europe and elsewhere (e.g. US, Australia).

**Ecology & Habitat: *Carassius auratus*, Goldfish**

**Dispersal Mechanisms**

Initially dispersed by release from captivity, then natural dispersal although this is often limited because of isolation in ponds and lakes.

**Reproduction**

Goldfish only grow to sexual maturity with enough water and appropriate nutrition (most can breed
in captivity, particularly in pond settings. Breeding usually happens after a significant temperature change, often in spring. Males chase females, prompting them to release their eggs by bumping and nudging. Spawning occurs in shallow water amongst weeds, and up to several hundred thousand small eggs (1-2mm diameter) are laid at once. Eggs are adhesive and attach to aquatic vegetation, especially where dense. Eggs hatch within 48 to 72 hours and young attach to aquatic plants for several days while yolk sac is absorbed. Within a week or so, fry begin to assume their final shape, although it can take up to a year before they develop a golden orange colour; until then they are the metallic brown or green-brown of their wild ancestors. (McDowall, 2000). Individual fish can spawn 3-10 lots of eggs at intervals of 8-10 days. Cold water during winter is essential for proper ova development.

**Known Predators/Herbivores**

Angling. General piscivory e.g. by birds, other fish, and when small, invertebrates such as dragonfly nymphs.

**Resistant Stages**

None known.

**Habitat Occupied in GB**

Usually still waters such as lakes and ponds; also some slow-flowing water. The presence of at least some dense vegetation preferred for egg-laying. Can withstand prolonged exposure to salinities above 15 ppt and can tolerate low levels of dissolved oxygen.

**Distribution: Carassius auratus, Goldfish**

Populations exist in still or slow-flowing waters in England (where they are widespread) and Wales, with records also from Scotland, primarily around the wider Glasgow area.

**Impacts: Carassius auratus, Goldfish**

**Environmental Impact**

Competes with native fish for spawning habitat and food. Readily hybridises e.g. with the native Crucian carp (*Carassius carassius*), reducing populations of unhybridised native species. Habitat damage e.g. through the impact on water quality by increasing turbidity and reducing macrophyte cover. Growth of cyanobacteria (associated with 'blooms') such as Microcystis aeruginosa has been shown to be increased by passage through the goldfish gut with algal growth also possibly increased by re-suspension of nutrients. Disease transmission, hosting non-native parasites. Predation of fish eggs and possibly other fish.

**Health and Social Impact**

There may be damage to habitats and/or native fish populations; hence associated loss of ecosystem services and amenity value.

**Economic Impact**

There could be costs due to eradication of goldfish and related diseases/parasites, protection of native species, or tackling damage to habitats.

Parasites include anchor worm, flukes, fish lice (e.g. Argulus), fungi, ciliates (e.g. Ichthyophthirius multifilis or 'Ich', Trichodina and Chilodinella) and flagellates (e.g. Costia, also known as Ichthyobodo).

**References & Links: Carassius auratus, Goldfish**

**Identification**

Environment Agency factsheet


**Biology, ecology, spread, vectors**


**Management and impact**


**General**
