

# ORNAMENTAL FISH *can become* MONUMENTAL PESTS

**Australia boasts about 220 species of freshwater fishes, many of which live right here in Queensland. They may be found in most natural water bodies from cool mountain streams to tropical swamps, from subterranean caves to desert artesian springs. Many species are capable of living in a variety of habitats and coping with a wide range of environmental conditions. In addition many native fishes have beautiful colours, spectacular fins or interesting behaviour and are comparable to any exotic fishes kept in aquariums. Keeping native fishes can also generate increased interest in Australian ecosystems and wildlife.**

While their natural hardiness and adaptability makes many native species ideal for life in captivity, there is one threat most native fishes cannot cope well with... sharing their natural habitat with feral pest fish (also known as introduced non-indigenous fish)...

Hundreds of species of exotic fishes have been imported into Australia for aquarium display purposes or aquaculture purposes, as sportfish, for bait and as biological control of nuisance aquatic organisms. As a result of the rapid expansion of the aquarium industry since 1963, the number of accidental and intentional releases of exotic freshwater aquarium fish into natural waterways has increased. Several of these releases have resulted in the establishment of breeding or self-maintaining populations of exotic species in Queensland waterways.

The aquarium hobby in Queensland is most popular in cities such as Brisbane, Townsville and Cairns. These centres are particularly susceptible to exotic fish introductions as they are heavily populated, with greater local impacts on urban creeks, ponds and streams.

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**Queensland Government**  
Department of Primary Industries

In Queensland fish are classified as native (or indigenous) fish or exotic (or non-indigenous) fish. Some of the exotic fish have been declared noxious...

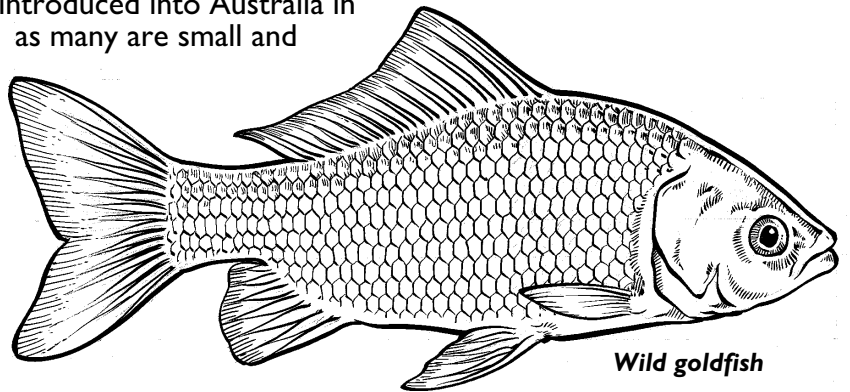
## Non-indigenous fish

non-indigenous fish can be brought into Queensland without a permit, if they are kept under certain conditions. All other introduced fish require a permit before they can be kept.

The *Fisheries Regulation 1995* lists a number of prescribed non-indigenous fish. Prescribed non-indigenous fish may be held in aquaria, above-ground ponds or other enclosures that prevent their escape, but cannot be released into the wild. Examples of prescribed non-indigenous fish that have established breeding populations in south-east Queensland include...

### Goldfish (*Carassius auratus*)

The goldfish, native to eastern Asia, was first introduced into Australia in 1876. Goldfish are popular as aquarium species as many are small and brightly coloured. They are now widely distributed in streams, ponds and dams throughout the southern half of Australia. The range of goldfish extends into south-east Queensland. Goldfish can also hybridise with the European carp. Goldfish are omnivorous with an extremely diverse diet. They eat large quantities of plant material (for example, algae) and aquatic insects (for example, caddisflies and mayflies). Goldfish are not useful for food or sport.



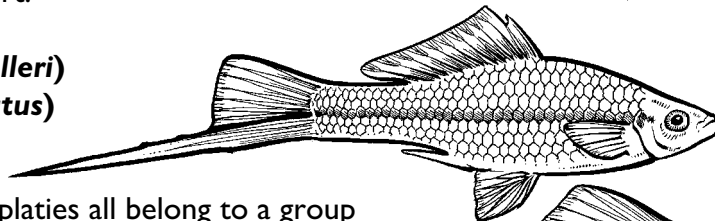
Wild goldfish

### Swordtail (*Xiphophorus helleri*)

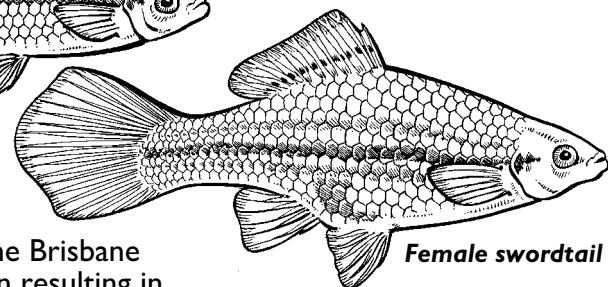
### Platy (*Xiphophorus maculatus*)

### Guppy (*Poecilia reticulata*)

Mosquito fish (see noxious fish), swordtails, guppies, and platies all belong to a group known as livebearers (Family Poeciliidae). Livebearers give birth to live young. These exotic species are known to dominate fish communities in many

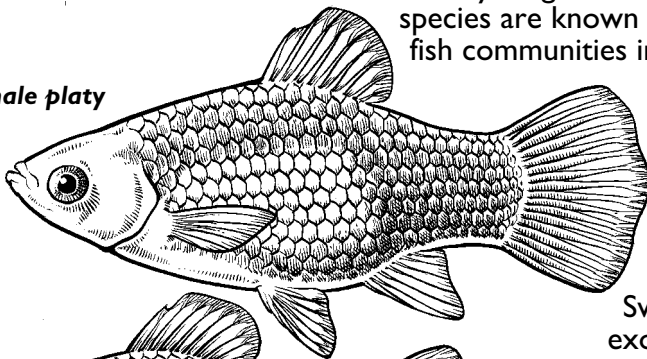


Male swordtail

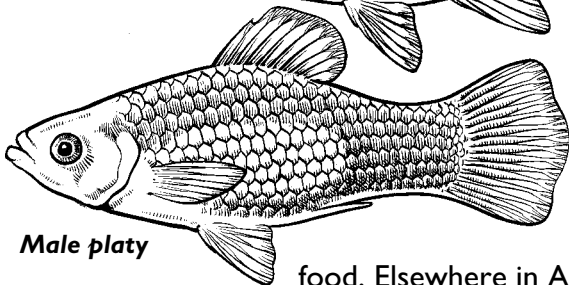


Female swordtail

Female platy

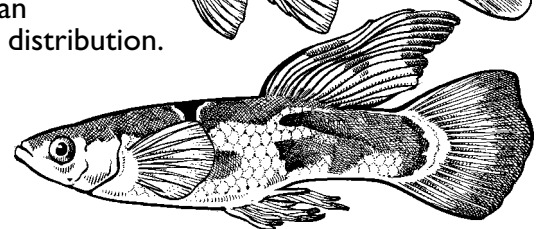
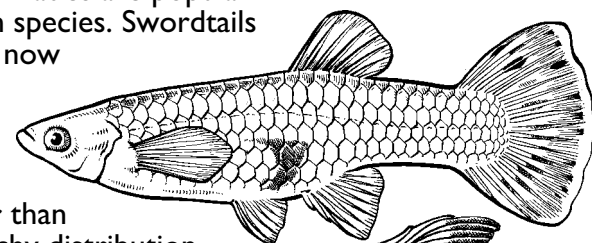


streams in the Brisbane region, often resulting in either a reduction in native fish numbers or the total elimination of native fish species. Many of these streams have a high level of habitat disturbance.



Male platy

Swordtails and Platies are popular exotic aquarium species. Swordtails in particular are now widely distributed in Brisbane and further north in coastal streams, and appear to compete for space rather than food. Elsewhere in Australia platies have a patchy distribution.



Female (top) and male (bottom) guppies

In general, the introduction of one live bearing species has been shown to have a detrimental effect on small surface dwelling native fish populations. When two or more species of livebearers are present, all surface-feeding native species become rare or disappear. For example, where guppies and mosquito fish (*Gambusia holbrooki*) are abundant in Brisbane streams, native fish are rare.

Heavy monetary penalties (up to \$150,000) may apply to persons convicted of releasing any non-indigenous fish into Queensland waters.

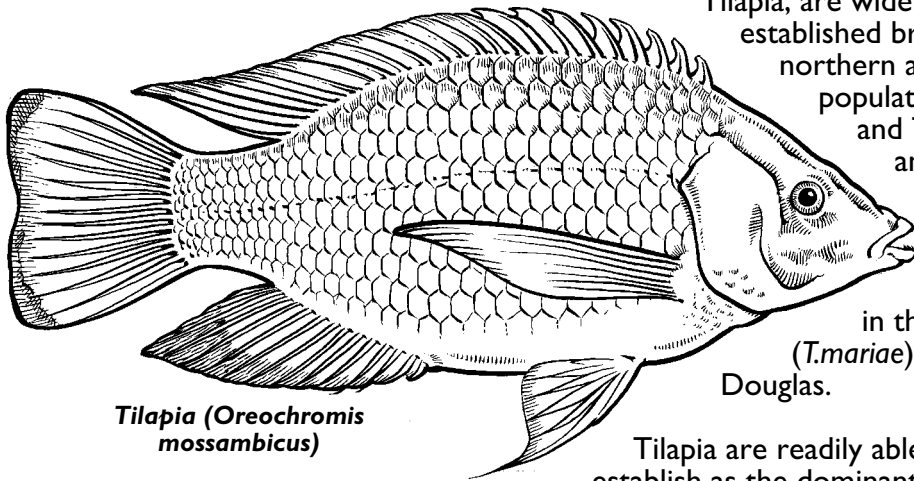
## Noxious fish

Noxious fish are considered to be extreme threats and it is illegal to possess them alive or dead.

There are 17 declared noxious fish in Queensland. Noxious fish are not poisonous, but are recognised as being extreme threats to native fish and/or fisheries habitats. Included in this list are tilapia (all species of the genera *Tilapia*, *Oreochromis* and *Sarotherodon*), carp (*Cyprinus carpio*) and *Gambusia* or mosquito fish (*Gambusia* spp.).

### Tilapia (*Oreochromis mossambicus*)

### Tilapia (*Tilapia mariae*)



*Tilapia (Oreochromis mossambicus)*

Tilapia, are widely distributed and problematic. They have established breeding populations at several sites in northern and southern Queensland. Confirmed populations in Brisbane exist at Tingalpa Reservoir and Tingalpa Creek, North Pine Dam, the North and South Pine rivers and Doves Lagoon at Sandgate. Populations may also exist in Lake Kurwongbah and several farm dams in the general area of North Pine Dam. In Northern Queensland, populations occur in the vicinity of Townsville (*T. mariae*), Cairns (*T. mariae*), Innisfail, the Atherton Tablelands and Port Douglas.

Tilapia are readily able to establish as the dominant

fish species in freshwater and upper estuaries, to the detriment of native fish populations. Its success as an invading species can be attributed to several factors, including:

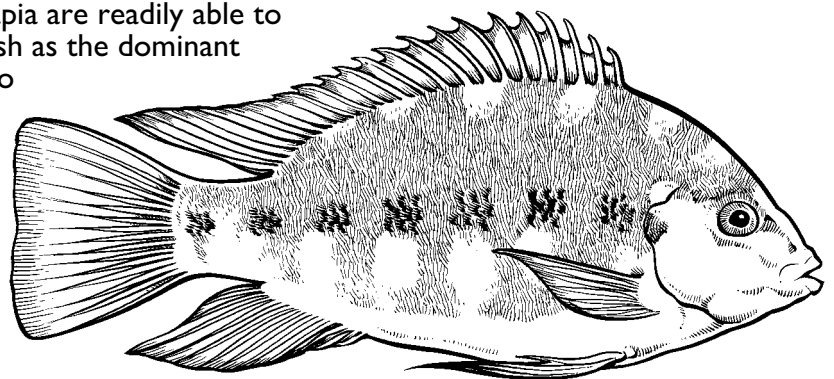
- simple food requirements.

Tilapia feed on items at the base of the aquatic food chain, i.e. algae, zooplankton and detritus, and therefore exploit a food resource unutilised by most native fishes. Furthermore, this species is able to switch food resources according to availability;

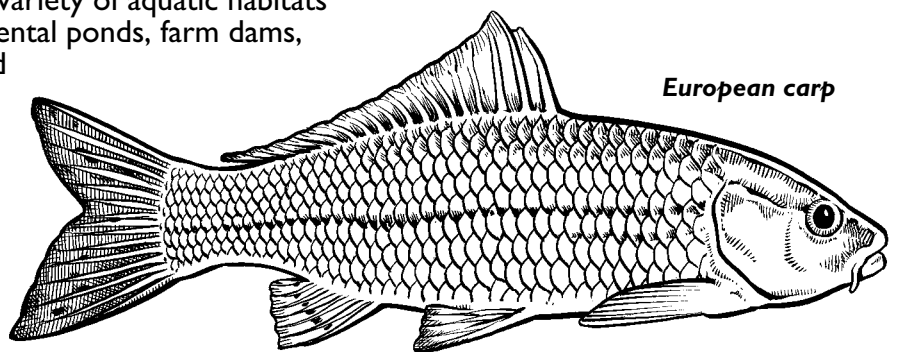
- flexible habitat preferences.

Within Australia Tilapia have colonised a variety of aquatic habitats including large artificial reservoirs, ornamental ponds, farm dams, artificial drainage channels, freshwater and the upper sections of tidally-flushed creeks;

- highly efficient reproductive strategy. Tilapia are prolific breeders, capable of reproducing several times a year when conditions are favourable.



*Tilapia (Tilapia mariae)*



*European carp*

### Carp (*Cyprinus carpio*)

One species of carp is found in Queensland

freshwaters: the European (or common) carp (including Koi and

Mirror varieties ). The European or Common carp was

originally imported into Australia as a sportfish. The

release of these carp species has resulted in the

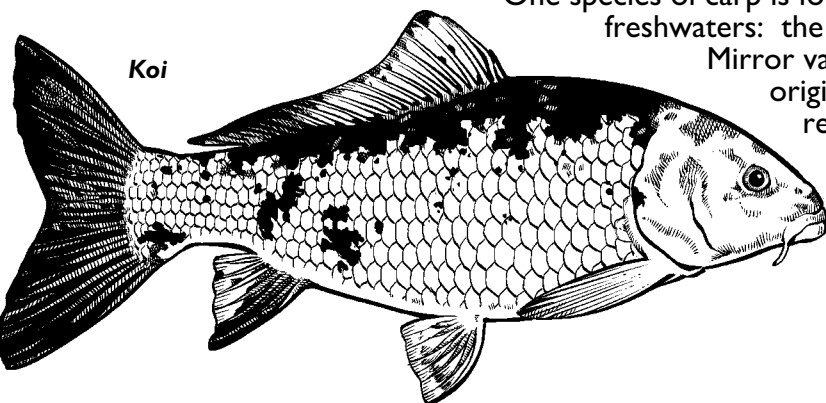
colonisation of many Australian freshwater

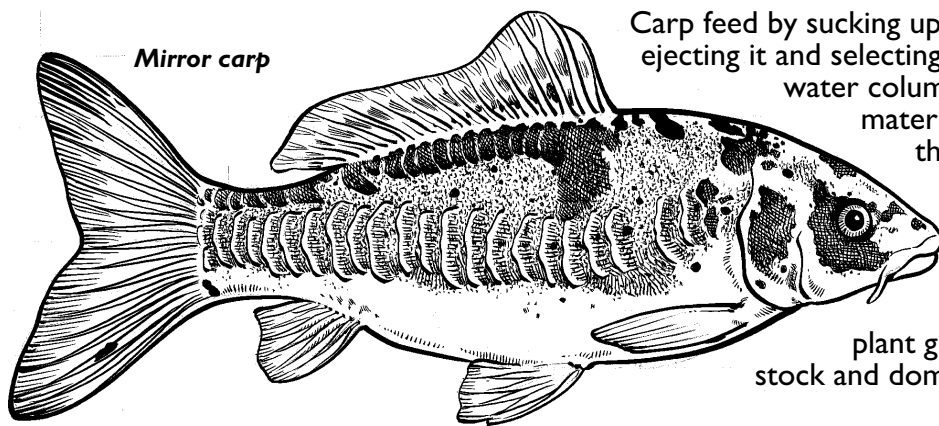
systems. The European carp, *Cyprinus carpio*, has a

more serious and destructive effect on the

environment than the Goldfish.

*Koi*





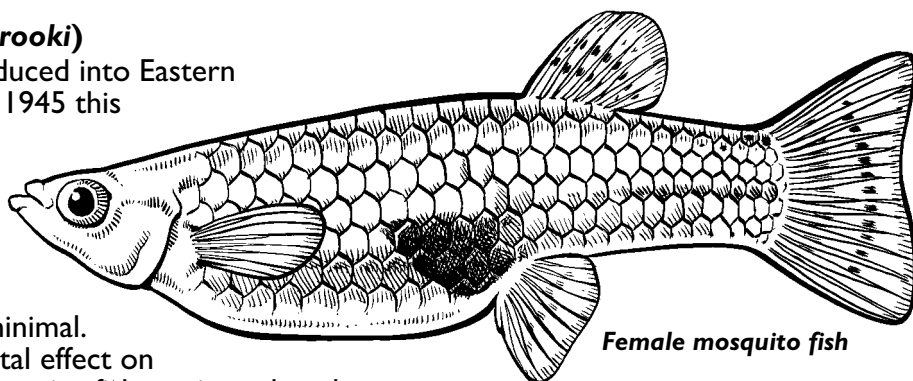
Mirror carp

Carp feed by sucking up mud and plants from the bottom, ejecting it and selecting food whilst it is suspended in the water column. This is known as roiling. The plant material itself plays a relatively minor role in the diet of carp. The water therefore has a continual muddy or turbid appearance and the vegetation is physically damaged or up-rooted from the substrate. This feeding behaviour makes conditions unfavourable for plant growth, fish food organisms and for stock and domestic use.

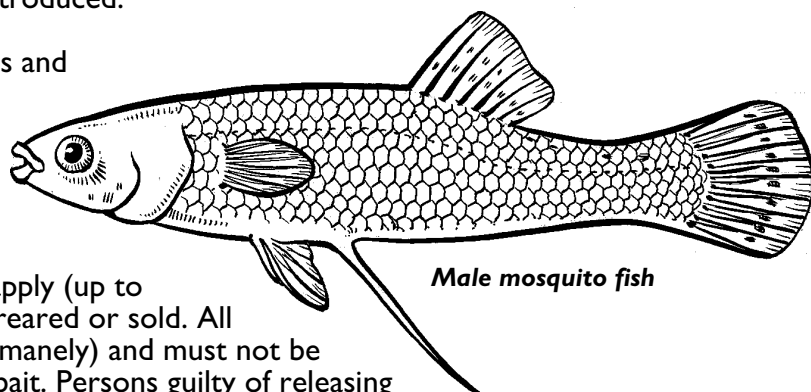
Carp can tolerate poor environmental conditions including high turbidity, a wide range of water temperatures (5 to 32°C), high salinities, and low dissolved oxygen levels. Carp will often survive where water quality is too low to support other fish species.

### Mosquito fish (*Gambusia holbrooki*)

The mosquito fish was first introduced into Eastern Australian waters in 1929 and by 1945 this species was widespread throughout eastern Queensland. Mosquito fish were originally imported from North America as a mosquito control agent. The impact mosquito fish has had on mosquito populations has been minimal. Rather, they have had a detrimental effect on native fish almost everywhere mosquito fish are introduced. Highly successful due to early maturation, a high reproductive rate, a large number of annual broods and their mode of reproduction (live bearing), this species is well known for aggressive behaviour and the habit of nipping the fins of other fish species.



Female mosquito fish



Male mosquito fish

It is illegal to have a noxious fish (dead or alive) in possession without a permit, and heavy penalties apply (up to \$150,000). Noxious fish cannot be kept, hatched, reared or sold. All noxious fish when caught should be destroyed (humanely) and must not be returned to the water. They must not be used as bait. Persons guilty of releasing noxious fish may be charged with the costs of eradication and removal of those fish.

### Why?

The introduction of exotic fish species often leads to a reduction in native fish numbers or the total exclusion of native fish species from natural waterways. Exotic fish species affect native species through direct competition for food and space, predation, habitat alterations and the introduction of exotic diseases and parasites.

In general, the introduced aquarium fishes have one or more attributes that enable them to successfully invade Australian waters. These attributes include: wide environmental tolerances; flexible food requirements; high reproductive output; early maturation; aggressive behaviour; and a lack of predators and competitors. Introduced species often inhabit and flourish in disturbed wetland habitats as these often have relatively abundant food resources and generally lack native fishes because of harsh and changed physical conditions.

### More information

EDFISH Wetlands Education Project: Aquarium Fish module.

DPI Note: Native fish as alternatives to the exotic fish, *Gambusia*, for mosquito control.

DPI Note: Noxious and non-indigenous fish. Commonly asked questions and answers.

OUTLAW: Noxious Fish Alert! CARP. DPI brochure

OUTLAW: Noxious Fish Alert! TILAPIA. DPI brochure

Fishweb: [www.dpi.qld.gov.au/fishweb/](http://www.dpi.qld.gov.au/fishweb/)

DPI Call Centre: 13 25 23