

The Suffering of Captive Fish

An examination of the ornamental fish industry reveals yet another tale of profit-motivated animal exploitation. The fish are mass-produced, leading to associated welfare problems and disease risks. Fish are expected to conform to a stipulated sex, colour and quality and those who don't 'make the grade' are killed.

Starved, mutilated and drugged

Those 'specimens' whose quality is deemed high enough for export will be starved for days before being transported in order to 'purge' them of the faeces that could dirty their water and cause ammonia pollution. Their fins may be hacked off to ensure that the transportation bags don't get punctured. They are packed densely into plastic bags and transported for thousands of miles before reaching the store shelf - creating ideal conditions for disease to spread. The fishes' delicate outer surface is damaged each time they are netted or handled and their resistance to stress and disease is lowered. Drugs are routinely added to their water in an attempt to solve the problem. Already, certain types of bacteria are becoming resistant to antibiotics.

It is this type of treatment of animals that has resulted in one disease outbreak after another sweeping through the intensive animal farming industry, along with the creation of antibiotic-resistant 'superbugs'. Surely the human race is innovative enough to create pictures and decorations that do not make use of live animals?

About fish

Fish are cold-blooded, which means that their temperature fluctuates in relation to the surrounding water. They are finely attuned to their environment by the senses of taste, touch, sight, smell, hearing and other faculties unique to fish.¹ They breathe through their gills - taking in water through their mouths, retaining the oxygen and passing it into their bloodstream. Most fish have a row of tiny pores on their side called the lateral line. These act as a hearing aid by sensing low frequency pressure waves and making them very sensitive to vibrations and reflections. They provide important information about food or predators from some distance. Outside the water, however, fish can hear no sounds.

Fish are short sighted. They see in colour and their eyes can look in separate directions at the same time. They use their tongues and lips to build nests, gather food and hide their young from danger. Some fish have taste buds on their body that detect the taste of food at a distance. The sensitivity of detection increases as the fish gets closer to the food source, which allows them to find food even when they cannot see it. They also have sensory



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organs called nares, which receive smell through the water rather than through the air. Additional sensory capabilities in some species can recognise and react to very low levels of electricity. The electrical impulses help them to find their prey and avoid predators. Stray electrical currents in fish culture units can therefore affect the fish.²

Fish feel pain

Increased heart rate, increased breathing rate, adrenaline rush, writhing, gasping - fish display similar signs to humans when under stress and faced with dangerous situations. Fish feel pain out of biological necessity, just as all mammals do. They possess a brain, central nervous system and pain receptors all over their bodies. Without the ability to feel pain they would not survive. They also produce enkephalins and endorphins, chemicals known to counter pain in humans. Scientific reports from around the world substantiate these basic realities.

The evidence of pain

In a key 1996 report examining the welfare of farmed fish, the Ministry of Agriculture's official advisory body, the Farm Animal Welfare Council, noted the following:

'Almost all fish live the whole of their lives in water and show a maximal emergency response when removed from water, even for a very short period. This response includes changes in heart rate, increased production of adrenaline, noradrenaline and cortisol and vigorous muscle contractions...' These changes 'often indicate fear in the fish...All of

*the scientific evidence concerning such effects makes it clear that the term stress is certainly relevant to fish and that the means by which stress effects are mediated are very similar to those in mammals. Evidence that the term pain is applicable to fish comes from anatomical, physiological and behavioural studies whose results are very similar to those of studies on birds and mammals. The fact that fish are cold blooded does not prevent them from having a pain system and, indeed, such a system is valuable in preserving life and maximising the biological fitness of individuals. The receptor cells, neuronal pathways and specialised transmitter substances in the pain system are very similar in fish to those in mammals.'*³

*'Fish react to stress and other environmental challenges in much the same way as traditional research animals.'*⁴

The Medway Report, an enquiry sponsored by the RSPCA into angling and shooting (1979), concluded:

'[The] evidence suggests that all vertebrates (including fish)... experience similar sensations to a greater or lesser degree in response to noxious stimuli.'

The report stated that there is no reason to differentiate between warm-blooded and cold-blooded creatures.

Even a study funded by the British Field Sports Society and the National Federation of Anglers found that capture of fish by anglers causes acute physiological stress.⁵

Dr Donald Broom, Professor of Animal Welfare at Cambridge University, has stated:

*'The scientific literature is quite clear. Anatomically, physiologically and biologically, the pain system in fish is virtually the same as in birds and mammals...in animal welfare terms, you have to put fishing in the same category as hunting.'*⁶

The most recent evidence comes from research conducted at the Roslin Institute near Edinburgh.⁷ Researchers took measurements from individual neurons in anaesthetised rainbow trout while they poked the fish's heads and applied acid and heat.

Analysis satisfied the team that fish have the 'neural hardware' to transmit pain messages. To determine whether this meant that they were capable of actually registering pain, they decided to look for behavioural responses that resemble those exhibited by a human in pain. The team compared the behaviour of fish who had either bee venom or acetic acid injected into their lips with animals that had received harmless saline.

The fish subjected to the hurtful chemicals showed clear signs of physiological stress. They took 90 minutes longer to resume feeding and their rate of gill breathing was characteristic of a fish swimming at top speed. They also rocked from side to side in a manner that the researchers compared with the repetitive behaviours sometimes seen in zoo animals. The fish treated with acid also rubbed their lips on the sides and bottom of the tank.

Lifespan

The lifespan of a fish is much longer than people tend to think. For example, goldfish can live for up to 25 years.⁸



Rearing and transportation

The majority of coldwater ornamental fish sold in the UK are imported. An estimated 35 million fish are imported through Heathrow airport every year. The main exporter is Singapore.⁹ These fish are typically farmed intensively in the source country, then caught and transported vast distances before arriving on the store shelf. The whole process is fraught with welfare problems and causes much suffering. Stressed, exhausted fish are more susceptible to disease. The industry's response has been to begin research into the development of vaccines that would produce a handsome income for the veterinary supply side of the industry.

Rearing

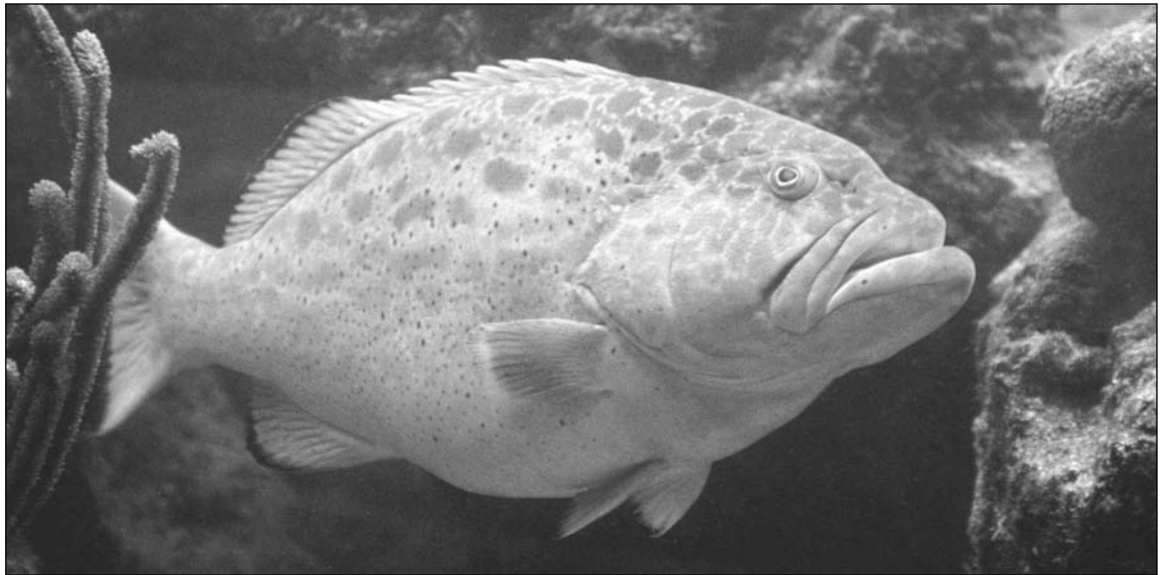
Ornamental fish fall into two broad categories:

1. Live-bearers - these include guppies and mollies, as well as platies and swordtails.
2. Egg-layers - including gouramis and danios.¹⁰

Live-bearers are grown almost exclusively in outdoor pools. Stocking rates for the breeding ponds can vary from 50 to 1000 fish. They are usually caught with baited traps, which are placed along the edges of the pond early in the morning. They are then sorted - some being sold, some put in another pond, others returned to the same pond, and some killed because they don't 'make the grade'.

Commercial production techniques for egg-layers are 'guarded closely by the producers'.¹¹ Most are bred in hatcheries and reared in tanks or ponds.

Undesirables are killed: Given that ornamental fish are valued for their appearance, it is no surprise that those who fail the quality test are unceremoniously disposed of. Most 'live-bearers' are hybrids or colour variations, and University of Florida researchers state



that, 'many are discarded because their colouration, finnage or quality do not conform to the desired type'. Buyers usually demand an equal ration of male and female fish and in most pond populations, the number of sexually mature males lags behind the number of females and so the 'excess' females are killed because there are no males to ship with them.¹² For these and other reasons, more than half the population of a pond is killed.

Handling and netting - a heavy toll of damage and disease

All fish experience physical damage during netting and transportation. This can result in symptoms such as split fins, cloudy eyes and increased susceptibility to disease and infections. Fish crowded together in a trap or net can rapidly deplete the oxygen supply.¹³

Because fish scales are not watertight, fish have a layer of protective mucus that keeps out infection and helps prevent the loss of electrolytes (salts) from the gills and skin.¹⁴ Mucus also forms a chemical barrier because it contains enzymes (lysozymes) and antibodies (immunoglobulins) which can kill invading organisms.¹⁵

Each time fish are netted, the mucus is damaged. Fish become more susceptible to infection and essential salts leach out into the aquarium water. Salt loss can lead to heart failure and muscle spasms.¹⁶ Mucus damage also results in decreased lubrication, meaning that fish need more energy to swim - often at times when their energy reserves are already being used up because of stress. Stress also causes chemical changes in the mucus which decrease its effectiveness as a barrier against invading organisms. Handling can damage fish scales and skin - another physical barrier to protect the fish from injury. Breaks in the skin or removed scales create an opening for infection.¹⁷

The stress of transportation

Prior to transportation, some ornamental fish may have their tail cut off, while other species may have corks or polystyrene pieces pushed onto their fin spines in order to prevent them from puncturing the bag.¹⁸

Fish are typically transported in plastic bags charged with oxygen.¹⁹ Between one and four bags are

usually packed into a box. Depending on size, up to 500 fish may be crammed into a single bag. Fish packers in Asia often use bags manufactured from stock tube plastic and heat-sealed at one end so there is only a single seam. These are called 'pillow bags' because there is no flat surface. Boxes are not big - an 'Asia Double Box' measures 60 x 42 x 30 cm and an 'Alternate Asia Box' 49 x 38 x 38 cm.

During the journey, fish will become stressed because of noise, vibration, confinement, crowding and unnatural water and temperature conditions - factors that can lead to disease and death later on.²⁰ Oxygen levels fall in the plastic bags and levels of ammonia and carbon dioxide increase.

Fish are starved: In an attempt to prevent ammonia building up from fish faeces, the fish are frequently starved before being packed up. The industry recommends that feeding should be withheld for a minimum of two days and up to five days, depending on species. One team of researchers states that, 'the absence of faeces in the tank will indicate that fish have had an adequate purge time prior to sorting, counting and shipping'.²¹

Fish are drugged: In an attempt to keep fish alive in these wholly unnatural conditions, sedatives, water quality stabilizers and antibiotics may be added to the water. The wide use of the antibiotic tetracycline in fish shipped out from Asia is leading to bacteria becoming immune to it.²²

Delays en route: Ornamental Fish International (OFI) (a worldwide organisation that represents all areas of the "ornamental aquatic industry" including wholesalers, importers, exporters, breeders etc) state that 'compliance with IATA (International Air Transport Association) Live Animal Regulations with regard to packing and handling procedures results in the vast majority of ornamental aquatic livestock enjoying global trouble-free transportation'. However, they continue, '[o]n occasions (but on an infrequent basis), consignments may become stranded in transit at airports, owing to missed flight connections, arrival outside veterinary inspection centre opening hours, essential documentation going astray, or several other factors. At such times, the welfare of the livestock could be placed at risk, particularly if delays prove excessive.' The OFI lists companies around the world which can 'rescue' stranded consignments.²³

What sort of condition do the fish arrive in after their lengthy journeys? One Hawaiian research team states: *'Fish that are densely packed in bags that have taken longer than expected to arrive may be suffering from exposure to accumulations of ammonia, thermal shock, or other problems'*.²⁴ But their ordeal is by no means over.

Problems of confinement

Temperature changes: Fish are highly sensitive to temperature and sudden changes affect their immune systems. Cold temperatures can completely halt the activity of 'killer cells' in the immune system and impair the fishes' ability to release antibodies against an invading organism, thus undermining their defence against disease. Excessively hot temperatures are also damaging.²⁵

Ammonia build up: When large numbers of fish are kept in a small space, nitrogenous wastes and ammonia build up. Producers supposedly use recirculating, biologically filtered water in an attempt to combat the problem.²⁶ Even so, one expert has stated that, *'[h]igh levels of ammonia are commonly associated with disease outbreaks when fish are crowded in vats or tanks'*.²⁷

Lack of oxygen: When numerous fish are kept in a small area, they can become deprived of sufficient oxygen. This is dangerous for the fish as *'[l]ow oxygen is a frequent cause of fish mortality in ponds, especially in the summer'*.²⁸

Small tanks: If fish are kept in tanks too small for their size, their health and growth is affected and they can develop deformities.²⁹ Silver sharks can grow to 14" and in the wild, they are fast swimming shoal fish. Imagine their frustration when confined in a tank! It's not just the limited space that stresses fish - the noise from pumping and filtering equipment also has a significant impact. Other factors causing stress to the fish include social mixing, water quality and lack of environmental enrichment.³⁰

Death and disease

Fish naturally carry a variety of pathogenic bacteria, fungi and parasites. Aquariums also harbour these organisms, which are especially prevalent in the gravel bed.³² Healthy fish with healthy immune systems should be able to fight off these ever-present disease organisms but unhealthy fish may fall victim. After the ordeal of transportation in crowded plastic bags, fish are stressed and particularly vulnerable to falling sick.

By depending on their 'emergency' energy reserves, fish are able to adapt to stress for a finite period but eventually, they become exhausted. At this point, their ability to resist the constantly-present disease organisms diminishes.

Hormones released from the adrenal gland during stressful periods suppress the fishes' inflammatory response. Inflammation is characterized by pain, swelling, redness or heat and constitute a protective response - an attempt by the body to destroy an invading bacteria, virus, parasite, fungus or toxin. Without this resistance, the fishes' ability to combat disease is lowered.

Types of disease: Fish can be affected by a huge range of infectious and non-infectious diseases. Infectious diseases are contagious and caused by parasites, bacteria, viruses or fungi. They are

usually treated with medication. Non-infectious diseases can be environmental, nutritional or genetic.³³

White spot disease or 'ich': This is particularly common amongst ornamental fish. Typically, they will develop small blister-like raised lesions along the body wall and/or fins. The gills become swollen and covered with thick mucus. If the infection spreads beyond the gills, white spots become visible. Ich can cause massive mortality within a short time.³⁴

Sick fish: Sick fish often stop feeding and may appear lethargic. Healthy fish should eat aggressively if fed at regularly scheduled times. Sick fish may be observed hanging listlessly in shallow water, gasping at the surface or rubbing against objects. They may develop sores (ulcers or haemorrhages), ragged fins, a distended, swollen abdomen and exophthalmia or 'pop-eye'.³⁵

Drug use

It has been acknowledged that *'indiscriminate and improper use of chemicals, including antibiotics, in fish is widespread in the aquatic animal industry'*.³⁶ Industry representatives recommend a host of treatments to combat the stresses inherent in breeding and transporting aquarium fish. As seen in the intensive animal farming industry, this is typically only a short-term solution. The internet company Aquapharm have admitted that *'use of traditional antibacterial medications has led to increased resistance of bacterial fish pathogens to medications'*. It proceeds to recommend mass drug treatments to combat disease, stating that *'[t]ropical fish retailers have found that treating all new fish with MelaFix reduces fish loss and improves the health and vigor'*.³⁷

It is common for fish-keepers to administer haphazardly a series of treatments to aquariums in attempts to cure sick fish. Florida university researchers state, *'[a] common mistake of fish culturists is misdiagnosing disease problems and treating their sick fish with the wrong medication or chemical. When the chemical doesn't work, they will try another, then another'*.³⁸





Vaccines for ulcer disease – a commercial bonanza

A major study, sponsored by the Department for Environment, Food and Rural Affairs (DEFRA) and backed by Heriot Watt University and commercial organisations including Neil Hardy Aquatica, aims to investigate the development and use of vaccines to control ulcer disease in coldwater ornamental fish. Their initial research states that '[l]arge numbers of individuals of these species (they refer to goldfish and koi carp) are imported annually into the UK. However, there is an ongoing problem of disease, namely ulcer disease, which may infect large numbers of fish. This disease may occur during transportation during the UK or develop soon after their arrival'.³⁹

The researchers see vaccination as an exciting commercial opportunity. *'Opportunities for sales of any successful vaccines would be global, and provide the UK with excellent opportunities to establish overseas markets.... Countries such as Japan, Israel, China and the USA among others produce significant volumes of goldfish and koi. These countries would represent significant export opportunities for any company producing an effective vaccine and vaccination strategy.'*⁴⁰

The industry

Big business

Ornamental fish are big business. They are kept by between 3 and 3.5 million households in the UK, making them the third most popular pet group after dogs and cats. One industry survey estimated the total UK ornamental fish population at 100 million. Retail sales of fish and associated goods amount to between £200 and £300 million a year, with coldwater fish contributing heavily to this figure. Around 2000 retail outlets sell live fish, more than 100 businesses import and wholesale them, and there are several hundred manufacturers servicing the needs of the industry. In total, more than 12 million ornamental fish are imported from all sources annually.⁴¹

The Malaysian Industry

The global retail value of the Malaysian ornamental fish industry is estimated at RM20billion (£1 = approximately 6 Malaysian Ringgits) but this increases fivefold if aquarium systems and accessories and feeds, drugs and other plants are included. Accessories include water filtration systems, pumps, aerators, lighting, water heating systems and water sterilisation equipment.

The industry started up in the 1950s and has been

developing heavily, with government support, since the 1980s. There are more than 400 farms, with 90% producing ornamental fish and 10% producing natural feed and aquatic plants. The government sees enormous potential for industry expansion and offers support services and fiscal incentives to promote its development. The government's National Agriculture Policy calls for the development of aquaculture, aquarium fish included. 96% of fish are exported and the industry is made up almost exclusively of freshwater species. Malaysian airport procedures have now been simplified in an attempt to stop the 'massive mortalities' that were occurring whilst exporters were held up at customs.⁴²

The Israeli industry

The annual turnover of the Israeli ornamental fish and marine plant industry is \$12 million. The fish are exported overseas, mainly to Europe. Israeli fish farmers work closely with Agrexco - the country's leading agricultural exporter. Ornamental fish and plants are sold under the 'Carmel' label, also seen on other Israeli products like avocados.⁴³

A new disease sprung up in Israeli fish farms between May 1998 and early 2000, resulting in massive mortalities. It was labeled Koi Herpes Virus (KHV). Exports of Israeli-bred Koi dropped dramatically in a short space of time and the disease began occurring in other countries. Export levels are only just recovering. Affected fish suffer from white patches on their gills, excessive mucus production, bleeding, ulceration, sunken eyes and spurts of intense activity interspersed with periods of lethargy. Most fish die within days.⁴⁴

Conclusions

Fish are sensitive creatures with complex needs. Their mass production and transportation is profoundly traumatising and results in a host of disease problems and high levels of mortality. The purchaser – who will often buy on impulse – may have no idea how to identify and treat sick fish or what conditions are necessary to give them some semblance of a comfortable life. Goldfish can live for 25 years; something the impulse buyer is unlikely to have taken into consideration.

All the evidence points to the fact that ornamental fish do not thrive in captivity and instead become stressed and sick. Animal Aid urges members of the public to stop and think before making a purchase of fish, from whatever outlet



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