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## **Fish welfare and the public perception of farmed fish**

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### Abstract

In most of Europe, fish from fish farms are not staple foods and many of the products are at the luxury end of the market. In this circumstance, the demand for the product is elastic and affected considerably by public perception. Concern for animal welfare is increasing rapidly and is a significant factor affecting whether or not animal products are bought. The fish farming industry cannot afford to ignore fish welfare when bad publicity about it could affect sales greatly.

The major areas where welfare problems exist at present are as follows: too high a stocking density, feeding methods which do not get food to all of the fish, failure to stun fish, pain in various circumstances, lack of sufficient environmental stimulation, disease, handling, transport of live fish.

### Public attitudes to animal welfare

Public concern about the welfare of animals has increased rapidly in recent years (Table 1) and Members of the European Parliament often receive more letters about animal welfare than about any other topic. Many people change their eating habits because of concern about animal welfare. In many countries, after concern about human health, animal welfare is the most important factor affecting food choice. The impact of production systems on the environment is also a significant factor.

### **Table 1**

#### **Evidence for increased concern about animal welfare**

1. Letters from public, media coverage.
2. References in parliamentary discussions and government statements.
3. Requests for scientific evidence concerning animal welfare.
4. Activity of scientific and other advisory committees.

5. Funding of scientific research on animal welfare.
6. Increased teaching and conferences.
7. More legislation.

The effects of this concern about animal welfare are mediated via increased scientific knowledge, legislation, public pressure and purchasing decisions. Legislative proposals in Europe which affect the welfare of farm animals stem from the organisations listed below.

**Table 2**

**Committees : welfare of farm animals**

**Council of Europe Standing Committee of the European Convention on the Welfare of Animals Kept for Farming Purposes.**

[national representatives plus a few observers/scientific advisors - produces Recommendations]

**E.U. Scientific Committee on Animal Health and Animal Welfare**  
(formerly Scientific Veterinary Committee, Animal Welfare Section)

[scientists, not national representatives - advises Commission and Council of Ministers]

**National animal welfare committees, e.g. Farm Animal Welfare Council in UK.**

[wide ranging membership - produces Reports and advice to Ministers]

Consumer purchasing and animal welfare

Goods which consumers consider to be essential have an inelastic demand so that higher purchasing price and some other costs which might be perceived to be associated with buying them, have little effect on demand. Other goods, however, which are regarded as more of a luxury or for which various alternatives exist, have an elastic demand. Small changes in purchase price, or other disadvantages associated with them, can result in large changes in demand.

In some countries, largely in the tropics, farmed fish are a major source of inexpensive protein and there is some consistency of demand. In Europe, North America and affluent East Asian countries, demand for any particular kind of fish is much more elastic and subject to fluctuations according to the public perception of the

product as well as the purchase price. If a product was perceived to be associated with bad effects on human health, animal welfare or the environment, sales could slump dramatically. The more valuable the product, the richer the consumers and the more likely they are to decide not to buy a product on grounds such as the poor welfare of the fish, see Broom (1994) for a review of the valuation of animal welfare.

### Fish welfare

The welfare of an animal is its state as regards its attempts to cope with its environment. This means that welfare is a characteristic of an individual animal which can vary from very good to very poor and which can be assessed scientifically. All aspects of coping methods are included in this definition: feelings in the brain, behavioural, physiological, immunological, etc. and welfare is poor if the individual has difficulty in coping or if it fails to cope. Health is the part of welfare which is concerned with trying to cope with pathological attack or injury and health can also be good or poor

Poor welfare occurs if animals feel pain or fear, or if they lack control of their environment, or if they are diseased, injured or starved. The terms stress, pain and fear are applicable to all vertebrate animals, including fish. The adrenal coping system involving adrenaline, noradrenaline and glucocorticoids such as corticosterone is similar in all vertebrates. Too much glucocorticoid production leads to immunosuppression in fish as it does in mammals.

There are some differences in sensory functioning between fish and mammals because fish live in water but the pain system of fish is very similar to that of birds and mammals. Fish have pain receptor cells, nociceptive neuronal pathways, specialised transmitter substances, electrophysiological responses to cuts, bruises and electric shocks, behavioural avoidance, learned avoidance of places where they had unpleasant experiences and processing systems in the brain which parallel those in birds and mammals. Hence at least some aspects of pain as we know it must be felt by fish.

When studying fish welfare, behavioural tests of strength of preference are useful. We should know more about how to recognise good welfare in fish. A range of indicators of poor welfare exists (Table 3).

### **Table 3.**

#### **Measures of poor welfare**

- Reduced life expectancy
- Reduced ability to grow or breed
- Body damage
- Disease
- Immunosuppression
- Physiological attempts to cope
- Behavioural attempts to cope

Behaviour pathology  
 Self narcotisation  
 Extent of behavioural aversion shown  
 Extent of suppression of normal behaviour  
 Extent to which normal physiological processes and anatomical  
 development are prevented

(after Broom and Johnson 1993)

Welfare assessment and awareness of animal welfare issues should be a part of any training course for those who work in the fish farming industry, indeed this was one of the recommendations of the UK Farm Animal Welfare Council Report on the Welfare of Farmed Fish.

A point which should be considered within the fish farming industry is the extent to which attitudes to fish welfare are affected by the terminology which is used. In English there has been a tendency to use plant terms when referring to fish. A cage full of salmon is sometimes called a crop and the process of slaughter is sometimes called harvesting. Farmers refer to "growing the fish" when it is the fish which grow and the farmer who feeds and manages them. Such terms make the fish seem less like individual animals and encourage farm staff to view them as objects rather than sentient beings and perhaps to treat them badly. Hence the terms "crop" and "harvest" and "growing the fish" should not be used.

#### Recommendations about improving fish welfare

The problems which were viewed as most important by the Farm Animal Welfare Council will now be mentioned briefly with the ones which I consider to be most important first.

#### Stocking density

Farmed salmon and trout kept at high stocking densities usually have damaged fins. It is likely that much of this damage is caused by either fin-chewing by other fish or as a result of contact with other fish rather than by contact with the cage or tank. Little is known of other adverse effects on welfare of high stocking density as appropriate measurements of welfare have not been made and even mortality rates are seldom monitored accurately. Proposals from the F.A.W.C. Report are those below:

The stocking density must allow fish to show most normal behaviour with minimal pain, stress and fear. Pending scientific research on the welfare of salmon in sea cages, 15 kg / m<sup>3</sup> should be considered as an acceptable stocking rate. Higher densities may also be acceptable for short periods prior to slaughter and during treatment for disease and parasites (Paragraph 121).

The stocking density must allow fish to show most normal behaviour with minimal pain, stress and fear. Scientific research is needed on the effect of stocking density on fish welfare but it seems that 30-40 kg / m<sup>3</sup> is too high a stocking rate for

trout. Higher densities may be acceptable for short periods prior to slaughter and during treatment for disease and parasites (Paragraph 144).

### Feeding methods

Food distribution in such a way that each individual can get sufficient food is a requirement for the keeping of farm animals. Farmed fish are usually subject to great competition when food is provided for them. Observations of salmon in cages during food provision show that the largest and fastest fish get a disproportionate amount of food and a high proportion of smaller animals which are less well able to compete are found at the edges of the cage. Observations during diving showed that smaller animals were at the cage edge all the way down to the bottom of the cage.

#### Recommendation:

Food should be distributed evenly and widely so that it reaches the maximum number of fish. Better systems for the provision of adequate amounts of food to all fish should be developed (Paragraph 92).

### Stunning

In European countries, and indeed in most countries in the world, farm animals are required to be killed in a humane way which includes prior stunning. This should be applied to fish also. It is unacceptable for fish to die from asphyxiation in air because welfare will be very poor at this time. Cooling on ice before death prolongs the period of poor welfare.

#### Recommendations:

Trout must be killed in a humane way and the widely used method of leaving the animals to suffocate in air is not acceptable. This situation and the need for control by legislation should be reviewed in the near future (Paragraph 254).

A satisfactory method of slaughtering trout en masse which renders them insensible instantaneously until death supervenes is urgently required. There should be research to develop acceptable methods of humanely killing trout, for example electrical methods. The method should be used in water or immediately after the fish are removed from water (Paragraph 255).

Staff employed in slaughter of fish must have the knowledge and skill to perform the task humanely and efficiently regardless of the method employed as required by the Welfare of Animals (Slaughter and Killing) Regulations 1995 (Paragraph 256).

When the percussive method is used the blow must be of sufficient force for the fish to be immediately rendered unconscious and for it to remain so until dead (Paragraph 257).

The cooling of live trout on ice after they have been removed from water should be prohibited (Paragraph 258).

Fish must be stunned or killed before their blood vessels (gill arches) are severed for bleeding and when stunned remain insensible until death supervenes (Paragraph 245).

#### Environmental quality enrichment

Fish are kept with conspecifics so they are not deprived of social contact. However, in other respects their environment is rather barren. More information is required on the effects on fish welfare of lack of environmentally enriching stimuli and on how to provide for all of the needs of fish including any need for varied stimulation. Hence it is recommended that the requirements of fish for environmental stimulation should be investigated.

#### Disease and parasitism

Pathogens and parasites generally cause poor welfare in fish. Hence it is important to manage fish so as to minimise disease.

#### Recommendations:

The industry should develop better methods of inspecting fish to recognise those which are diseased, distressed or dead (Paragraph 199).

Handling should be minimised so as to lessen susceptibility to disease (Paragraph 205).

It is essential that the welfare of farmed fish is not adversely affected by limiting the availability of vaccines or therapeutic medicines which are known to be effective and do not pose a food safety or environmental hazard. Ways must therefore be found to achieve rapid availability of vaccines and medicines to deal with emergencies such as major outbreaks of disease, and also to increase the range of vaccines and medicines approved for the treatment of fish. Well-tried and efficient medicines must not be lost unless adequate alternatives are available (Paragraph 218).

#### Handling, grading and transport

Fish show a maximal emergency adrenal response when removed from water. Methods of movement of fish which do not require removal from water are usually preferable on grounds of fish welfare. However, all handling, many aspects of the grading procedure and some aspects of transport are very stressful to fish.

#### Recommendations:

Fish populations should not be graded more often than is absolutely necessary since most kinds of grading are likely to be stressful for fish (Paragraph 158).

Fish in transit should be in conditions which will allow them to survive a journey at least 50 per cent longer than the anticipated duration (Paragraph 165).

Both the salmon and trout industries should give consideration to the need for Codes of Practice on transport which refer directly to fish welfare (Paragraph 166).

During the stripping and milking processes the number of times a fish is handled and exposed to sedation should be minimised to avoid undue skin injury and stress; effective anaesthetics must be used and these must be maintained at an effective concentration throughout sedation and anaesthesia (Paragraph 127).

### Other points

#### Recommendations:

In principle FAWC is opposed to the unnecessary mutilation of farmed animals solely as an aid to management. Mutilations which involve removal of sensitive tissue should not be carried out on farmed fish (Paragraph 220).

Where measures are taken to protect fish from predators this should always be done in a way which minimises poor welfare of the predators and does not endanger predator populations. The killing of predators should be a last resort (Paragraph 228).

No use of genetic engineering outside the control of the Animals (Scientific Procedures) Act 1986, except for currently used procedures for triploid fish production, should be permitted unless the absence of effects of the procedure on the welfare of the fish has been demonstrated by properly conducted scientific studies (Paragraph 232).

### Conclusions

There are several causes of poor welfare in farmed fish. Although these require more investigation, some changes in practice are necessary in the industry now. The fish farming industry has to have a good image with the public in relation to animal welfare. There will not be a good image unless some practices are changed so the industry is vulnerable at present. However, with some relatively inexpensive changes the welfare of farmed fish can be good and this fact can be used in marketing.

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