

ANIMAL PROCEDURES COMMITTEE

June 2009

Supplementary Review of Schedule 1 of the Animals
(Scientific Procedures) Act 1986

Appropriate methods of humane killing for fish

Fish use in UK 2008

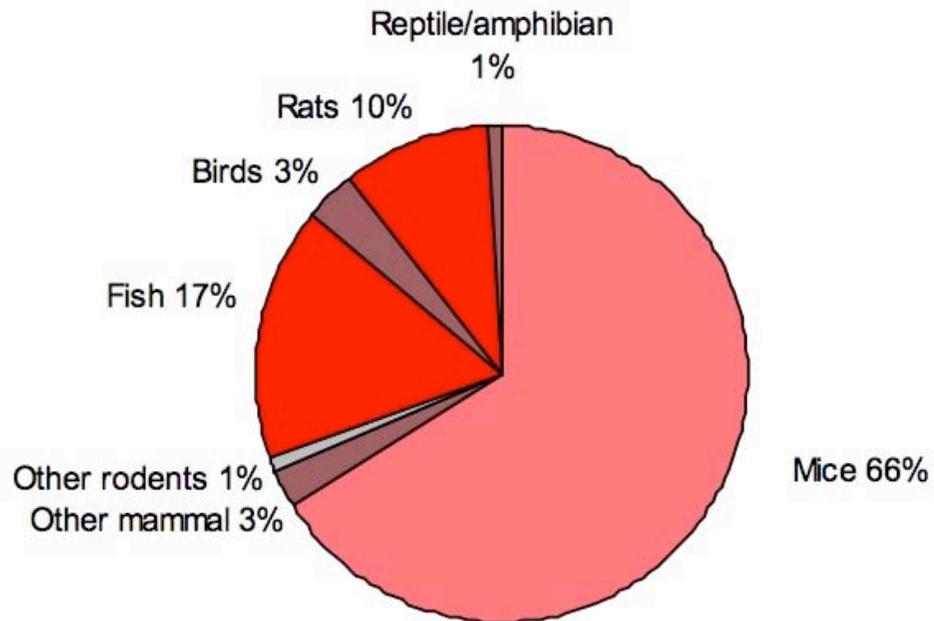
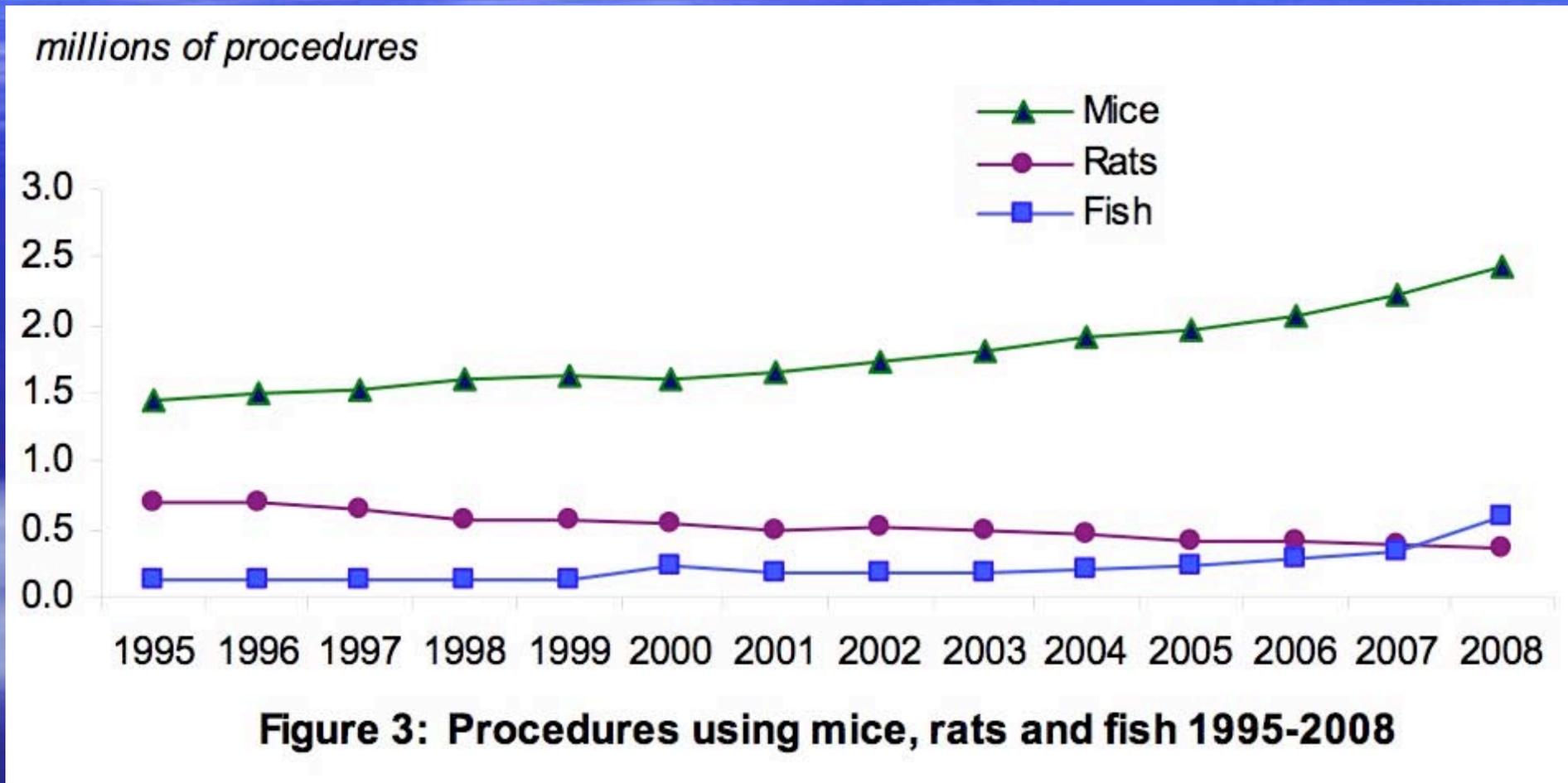


Figure 2: Procedures by species of animal, 2008 (Table 1)

Fish up 278,000 (85%) to 605,155 procedures
but this increase was partly accounted for by a change in the stage of development at which fish fry were counted.

Use of fish in the UK



Use of fish in Europe

The background of the slide is a photograph of a vast, deep blue ocean. The water is a rich, dark blue, and the horizon line is visible in the distance, where the water meets a lighter blue sky. The overall effect is a sense of depth and vastness.

COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 5.11.2007 COM(2007) 675 final

Fifth Report from the Commission to the Council and the European Parliament on the Statistics on the number of animals used for experimental and other scientific purposes in the member states of the European Union
2005

Fish numbers in EU 25 2002	Fish numbers in EU 25 2005
1,586,403	1,749,178 (10.3% increase)

http://ec.europa.eu/environment/chemicals/lab_animals/reports_en.htm

Areas considered by the sub-committee for work

- Capacity for suffering
- Refinement of experimental procedures
- Housing and husbandry
- Welfare measures
- Capture and restraint
- Anaesthesia, analgesia and euthanasia

2006 - APC review of appropriate methods of humane killing for animals used in research

- This report noted that there was a need for further consideration of fish euthanasia.
- And that the humane killing of fish and embryonated eggs are areas of continuing debate and research.

Working Methods

- Questionnaire on use of current techniques
- Co-opted an expert group to advise the Committee

Practical factors that affect the choice of humane killing technique

- Equipment and labour costs
- Aesthetics
- Safety
- Range of species and developmental stage
- Numbers of animals to be euthanased
- Housing conditions
- Experimental design which may not allow killing *in situ*

APC 2006: “killing is not humane unless either the animal loses sensibility instantaneously, or very rapidly (over one or a few seconds), or where loss of consciousness takes longer but the technique does not result in poor welfare”

Animal Welfare Factors to consider:

- Speed of induction of loss of consciousness
- Aversiveness of substance and/or solvents
- Events before euthanasia

- + non AW issues eg Disposal of the agent

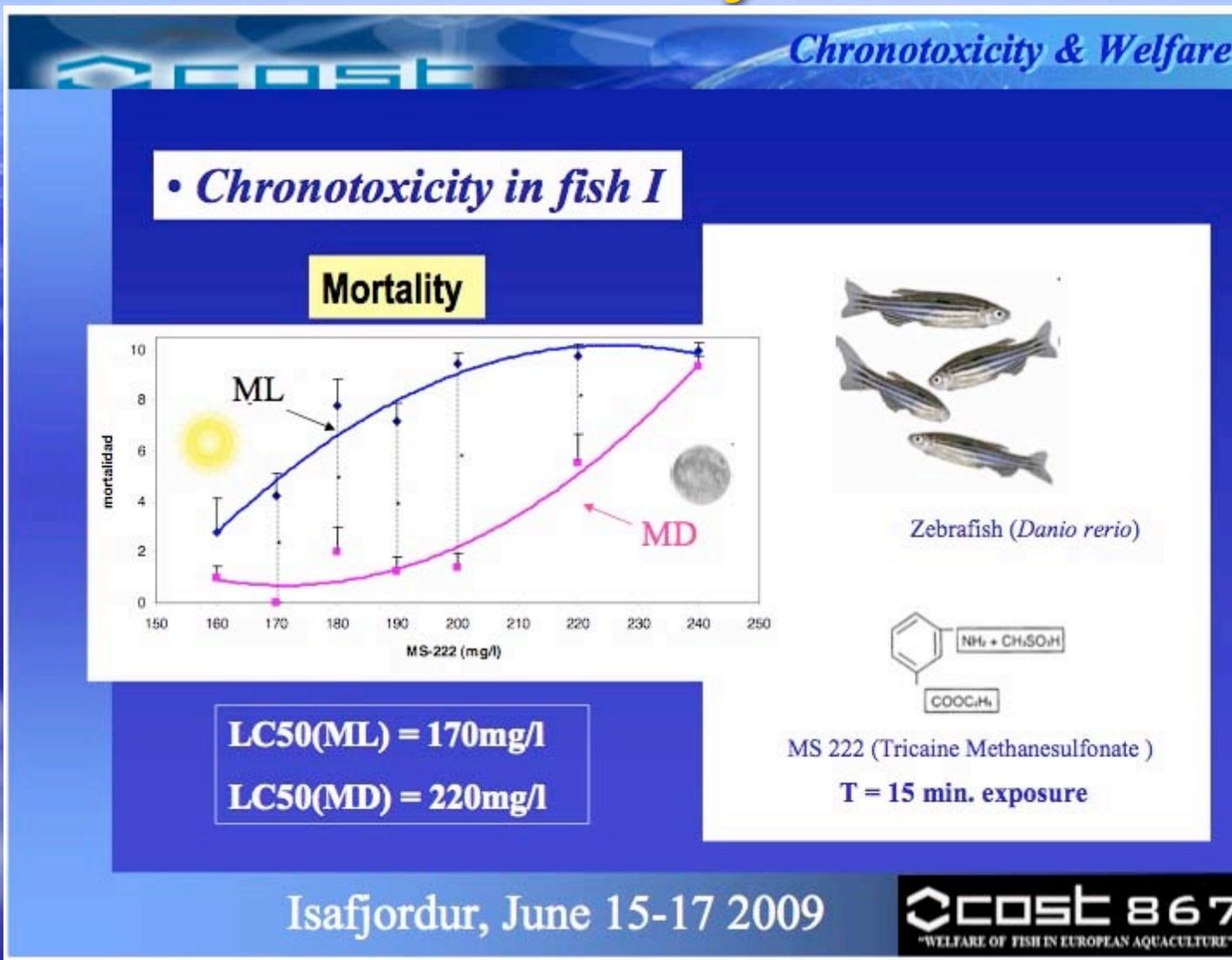
Assessment of current techniques permissible in the UK without authority

1. Concussion
followed by
brain
destruction

2. Overdose of anaesthetic using a route and an anaesthetic agent appropriate for the size and species of animal

- Most common agents benzocaine, benzocaine hydrochloride and MS222 (tricaine methane sulphonate),
- Others such as quinaldine sulphate and 2-phenoxyethanol may also be used.

Chronotoxicity MS222



Midday LD50 is 170mg/l, midnight LD50 is 220mg/l

Slide Courtesy Dr Javier Sanchez Vazquez, The Physiology Department, Murcia University, Spain

Possible aversiveness of chemicals used for euthanasia

- Lack of research
- Anecdotal accounts:
 - aversive reactions in trout when they are introduced to water containing the agent at the full recommended dose;
 - aversive reactions in salmon when the agent is gradually introduced to their water;
 - catfish attempting to leave the water once the anaesthetic has been introduced.

Rats and CO₂



The video is of the gradual fill procedure at a flow rate of 20%/min - the rat is cued to enter at the beginning and gas flow starts as soon as the rat enters the chamber.

The rats were unwilling to tolerate extended exposure to 15 and 20% CO₂, and concentrations greater than 30% are necessary to cause loss of consciousness

Niel & Weary (2007) *Applied Animal Behaviour Science* **107**:100-109

Video courtesy of:

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Other potential stressors prior to killing

- Emersion
- Netting/Handling

Ways to reduce handling stress - Refinement -

- By transfer within water containers
- Or by killing in home tank - but:
 - Only in isolated tanks cf tanks sharing a common filter system
 - Killing of single fish would require single housing
 - Tank would have to be visually isolated under current UK regulations

Other possible euthanasia techniques

- Maceration
- Microwave radiation
- Chilling
- Electrical stunning prior to overdose of anaesthetic
- Electrical stunning prior to destruction of the brain
- Electrical killing

Recommendations

- Research needed into aversiveness of MS222, etc
- Maceration can be humane and there could be a case for its inclusion
- Chilling should not be permitted unless research indicates that it is humane for certain species
- Research is needed into electrical euthanasia in the research environment.

Full report available at <http://apc.homeoffice.gov.uk/>

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