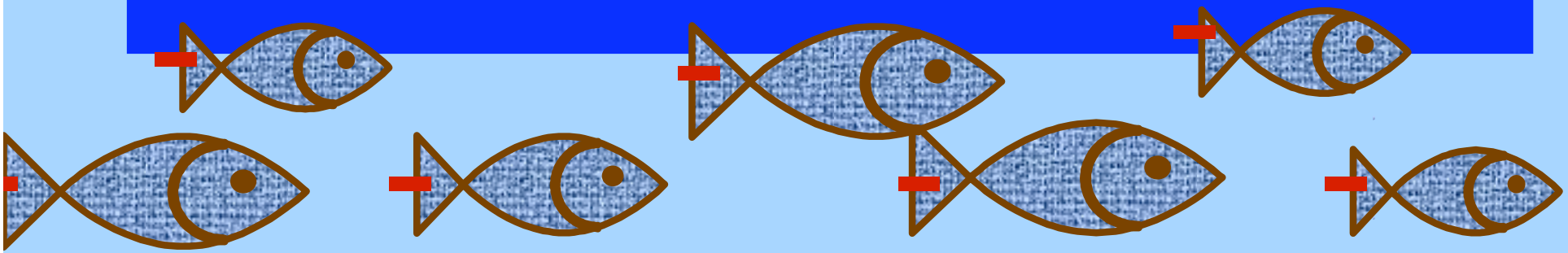
An overview of existing guidelines for handling, bleeding, administration and identification techniques



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“Wish list” from the 2005 meeting

- Species-specific guidelines for the care and use of fish
- Easy access to the latest knowledge
  - because regulations and guidelines can change
  - a closed discussion group would help
- Guidance on best practice, not a standard set of techniques
- Education for scientists on information retrieval

Views on guidelines in 2005

- Lots of guidelines on procedures; can be difficult to access
  - Need to “pull them together”
- Identification - best practice varies with circumstances, guidance would be helpful
  - “Marking methods” table should be produced
- Blood sampling - acceptable volumes based on total blood volume needed for each species
- Methods should be proven before changing practice

Scope of the talk

- Many regulations and guidelines require refinement
  - Norwegian Animal Welfare Act
  - European Commission Directive 86/609
  - UK Animals (Scientific Procedures) Act 1986
- General requirement to use least painful/stressful technique possible
- This talk only covers guidelines specific to fish

Outline of the talk

- How the search for guidelines on handling, sampling, administration, identification was done
- Current guidelines
- What they say
- How they relate to current views on good practice and the 2005 “wish list”
- What still needs to be addressed

Guideline search

- CCAC
- Norwegian School of Veterinary Science
- NC3Rs
- USDA Animal Welfare Information Centre
- COST Action B24
- Johns Hopkins Altweb
- www.fishwelfare.net
- Animal Welfare Institute
- Concerted Action for Tagging of Fishes
- Current legislation on animal experimentation

What do we have?

1. FISHBIO www.fishmarking.com (2007)

2. Council of Europe Convention ETS123 Appendix A (2006)

3. CCAC Guidelines on: The Care and Use of Fish in Research, Teaching and Testing (2005)

What do we have (2)?

4. UK Home Office: Focus on Fish (2005)
   - http://scienceandresearch.homeoffice.gov.uk/animal-research/ see Animals (Scientific Procedures) Inspectorate Annual Report for 2005
5. Guidelines for the Use of Fishes in Research (2004)
   - American Fisheries Society, American Institute of Fishery Research Biologists, American Society of Ichthyologists and Herpetologists

What do we have (3)?

6. CATAG (2002) Improvements in Tagging Methods for Stock Assessment and Research in Fisheries
   - www.hafro.is/catag/
7. The Laboratory Fish (2000)
8. UFAW Handbook on the Care and Management of Laboratory Animals, 7th edn, Volume 2 (1999)
   - UFAW is hoping 8th will be published in 2010

What should they encompass?

- Welfare principles
  - Impact on the fish - stress, welfare
  - Potential for physical damage, health issues
  - … with BVAAWF/FRAME/RSPCA/UFAW Joint Working Group on Refinement approach in mind
- And from 2005 “wish list”...
  - Species-specific guidance
  - Proven methods
  - Guidance on identifying and implementing best practice

Handling

- ETS123, Home Office, UFAW
  - Mention stress, damage, provide minimal guidance
  - ETS123, Home Office: anaesthesia
  - UFAW: “wet transfer”
- AFS
  - Stress, damage, more guidance
  - Eliminate rough handling, abrasion, sudden changes in water quality
  - Wet transfer, anaesthesia (to reduce metabolic rate)

CCAC on handling

- Stress, damage
- Staff training
- Avoid and minimise handling
- Use of anaesthetics, sedatives
- Minimise visual stimulation to fish
- Minimise time out of water, up to 30 seconds
- No species-specific guidelines

Blood sampling

- UFAW: freshwater fish
  - Anaesthesia or restraint, restrainer design
  - Recommends needle size
  - 0.5 ml from 150 g fish
  - Caudal vessels or cardiac puncture - with recovery?
- UFAW: marine fish
  - Blood volume is 3 - 5 % body mass
  - Cardiac puncture without recovery
  - Cutaneous vein or suborbital sinus

Blood sampling

- AFS
  - Sterile conditions impossible in field
  - Mentions anaesthesia
  - Venous puncture, caudal bleed, cardiac puncture (with recovery?)
  - Cannulation
  - Amputate tail under terminal anaesthesia

Blood sampling

- The Laboratory Fish
  - Much technical detail, *e.g.* anticoagulants, cannula materials
    - Caudal puncture
    - Tail amputation (without recovery)
    - Cardiac puncture (single collection)
    - Cannulae - dorsal or ventral aorta, caudal vein
  - Nothing about welfare

Blood sampling

- CCAC
  - 1 ml kg^{-1} in general (0.15 ml in 150 g fish)
  - Recover haematocrit before next sample - this is temperature dependent and species-specific
  - Sedation/anaesthesia
  - Staff training
  - Sterile equipment
  - Ventral tail vein, dorsal aorta, cardiac puncture (with recovery?)
  - Cannulation in teleosts over 150 g

Blood sampling - summary

- Most mention anaesthesia
- Different levels of detail and consideration for welfare/refinement
- No guidance on choosing optimal route from welfare aspect
- No species-specific guidelines
- Cardiac puncture with recovery - not recommended for mammals; is it acceptable for fish?

Administering substances

- UFAW: freshwater fish
  - Injections - sites, examples of needle gauge, volume
- The Laboratory Fish
  - Technical detail, *e.g.* chamber design, vehicles
    - Water-borne exposure
    - Oral administration; via feed or gavage
    - Injection: iv, ip, im
    - Implants; pellets, osmotic pumps
    - Topical exposure
  - Nothing on welfare

Administering substances

- CCAC
  - Range of routes
    - Branchial diffusion
    - Oral gavage (1 ml per 100 g)
    - Injection - im, ip, iv
    - Implants
    - Windows, bioreactors
  - Practical guidance on how to get it in but less focus on fish's experience or choosing method
  - Further references recommended

Administration summary

- Some practical guidance on protocols
- Overall, more technical than animal-centred guidance
- Very little on dose volumes
- Nothing species-specific
- No guidance on identifying best practice

Identification

- ETS123
  - Anaesthesia, some guidance on least invasive
- AFS
  - Harms and benefits of marking
  - Users should review recent literature
  - Information on different techniques
- UFAW
  - Freshwater fish: mentions microchips; marine fish: stress of tagging, user should review literature

Identification

- Home Office
  - List of methods
  - Dye/elastomer marking possibly causes least pain, suffering or distress
  - Fin removal “least refined”

Identification

- CCAC
  - Principles for reducing stress during marking and subsequent identification; potential harms
  - Pilot studies for new methods; evaluation of welfare impact
  - Mentions tissue marking, tagging, genetic markers, internal tags and marks
  - Techniques that cause significant tissue injury should only be used if no alternative and justified to animal care committee

Identification

- CATAG
  - Minimise pain, stress, adverse effects on health
  - Review data before tagging or do pilot studies
  - Fish taggers should all undergo training
  - Use of anaesthesia
  - Research needed into “anaesthetic” effects of low temperature
  - Pay attention to physiological impact of device and attachment methods

Identification

- www.fishmarking.com
  - Definitions, advantages, disadvantages and other resources for long list of techniques
    - External attached tags; dye submersion; innoculation/tattoo/photonic; branding (non-chemical and chemical); fin clip; body cavity tag; coded wire tag (CWT); acoustic tags; visual implant/elastomeres/fluorescent tags; data storage tags; PIT tags; DNA; calcein binding to scales; oxytetracycline bath; otolith marking
  - Little on welfare; mentions tissue damage, behaviour, mortality

Identification summary

- More on this than handling, administration or blood sampling procedures
- Information on techniques
- Information on harms
- Principles for refinement
- It would be nice if this were all in the same place - with guidance on preference from a welfare point of view!

What has happened since 2005?

- Species-specific guidelines for the care and use of fish ✗
- Easy access to the latest knowledge ?
  - because regulations and guidelines can change
  - a closed discussion group would help
- Guidance on best practice ✗
- Education for scientists on information retrieval ?

Guidelines since 2005

- Lots of guidelines on procedures; can be difficult to access
  - Need to “pull them together” X
- Identification - varies with circumstances, guidance would be helpful X
  - “Marking methods” table
- Blood sampling - acceptable volumes based on TBV for each species needed X
- Methods would need to be proven before changing practice X

To sum up ...

- CCAC is best overall re coverage and welfare
- No species-specific guidelines for fish handling, blood sampling, administration of substances or identification
  - But what do we mean by “species-specific”? Most commonly used species?
- Guidance on identifying and implementing best practice urgently needed
  - Based on scientific evidence where it exists - otherwise need to consolidate good practice, continually monitor and evaluate

Fin

Photo: Chris Latham, www.flickr.com