Fishy Ethics

Fish welfare and moral status in aquaculture

May 16, 2018  Bernice Bovenkerk
Why sustainable aquaculture?
Aquaculture & sustainability: concerns

- **Efficiency problem:**
  1.9 kilo wild fish needed for generating 1 kilo of (piscivorous) fish

- **Environmental problems:**

  - Fish faeces & food pollution, pathogens
  - Habitat destruction
  - Introduction exotic species

- **Fish welfare problems**
Fish welfare: a interaction between science and ethics

How to implement welfare? In 7 steps

How to weigh welfare vis-à-vis other values?

What does welfare mean? How do you define it?
Welfare is a concept that combines moral norms and biological ideas

How one defines welfare shows moral convictions and biological suppositions

First: balanced biological functioning or coping

Later: subjective experiences

> absence of pain

> positive experiences
Definitions of animal welfare II

- Welfare assessment: emphasis often still on absence of pain
- Farm Animal Welfare Council 5 freedoms:
  - Hunger and thirst
  - Discomfort and pain
  - Injury or disease
  - Fear and distress
  - To express normal/natural behaviour
Definitions of animal welfare III

- 3 groups of visions:
  1) Based on functioning/ coping
  2) Based on feeling/ subjective experience
  3) Based on natural behaviour

Someone’s moral background determines where one puts emphasis
Welfare:
subjective (emotional) state of an organism which is reflected by its ability to cope with presented challenges

Environmental challenges

Determined and affected by the interaction of:
- Subject characteristics: sex, age, genetic make-up, life history, personality
- Environment characteristics: enrichment, predictability, duration
Fish welfare: a interaction

How to implement welfare?

How to weigh welfare vis-à-vis other values?

What does welfare mean? How do you define it?

How do you measure welfare?
How do you measure welfare?

- At first sight seems a purely empirical affair, but value-moments in research
- 2 research groups can reach opposite conclusions about welfare based on same set of data
Preference tests

Helpful, but some problems:
- What exactly do you measure?
- Best of 2 evils?
- Familiarity? Curiosity?
- Short-term vs. long-term welfare
- Emphasis on objectively measurable
- Should welfare be measured on the level of the individual or the group?
Environmental challenges

Welfare:
subjective (emotional) state of an organism which is reflected by its ability to cope with presented challenges

Parameters indicative of allostatic load/state:
- **Behaviour:** cope with challenges, learning, anxiety, fearfullness
- **Physiology:** cortisol base-line, recovery following challenges
- **Gene expression:** mr, gr-alpha, gr-beta and their ratio
- **Disease:** susceptibility, recovery, mortality

Adaptive capacity

Threshold
Reward system & enrichment

3 weeks of offering enjoyable food
(small crustaceans)

Enriched environment

Boerrigter, et al. (under review)
Manuel, et al. (in prep)
Reward system & enrichment

Enrichment reduces anxiety-like behaviour in *zebrafish* (reduced shelter seeking)

Enrichment and hedonic feeding reduces fear/avoidance for a negative stimulus

Enrichment reduces up-regulation of genes in the brain which are associated with stress
Fish welfare: a interaction

1. How to implement welfare?

2. How to weigh welfare vis-à-vis other values?

3. How do you define welfare?

4. How do you measure welfare?

5. Why is welfare important?
Why is welfare important?

- Speaking about welfare presupposes that welfare is relevant for our moral decisions.
- Assumes that animals have an interest in the absence of pain and suffering and the presence of pleasure, or in natural behaviour.
- Presuppose certain moral theories and excludes other ones.
Fish welfare: a interaction

1. How to implement welfare?

2. How to weigh welfare?

3. How to define welfare?

4. How to measure welfare?

5. Why is welfare important?

6. Do fish have the capacities that a focus on welfare presupposes?

7. Why do animals count?
Welfare: an interaction

Moral status of the animal

Why do animals count?

Do animals have the capacities that a focus on welfare presupposes?

Ethicists need scientific input and scientists need ethical input
Three modes of thinking on ‘moral status’ of animals

<table>
<thead>
<tr>
<th>Sources of moral status</th>
<th>Ethical reasoning, ideal way of being</th>
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<tr>
<td>‘Sentience’ / ‘Subject of a life’</td>
<td>Rational, altruistic</td>
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<tr>
<td>Empathy / Sympathy</td>
<td>Relational, friendly</td>
</tr>
<tr>
<td>Awe</td>
<td>Immersive, modest?</td>
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</table>
Empathy - line difficult

- Not cuddly
- No clear facial expression
- We cannot hear them
- Difficult to establish a relationship with a fish
Fish with antifreeze in their blood

- Sex-change in fish
- Fish that swim thousands of kilometers to find their way home
- Fish that change the position of their mouth to climb rocks

Moray eels and groupers: cooperative hunting across species
Fish do consciously experience pain

Trout research with bee poison and vinegar

Novel object test

Combines behaviour with physiological data

Pain has an evolutionary function

Does assume that fish experience pain differently than people. What exactly does this mean?

However, note that there are over 30,000 species of fish: can’t generalise >

More research needed
When we are trying to determine how to implement fish welfare at the farm, we need to first answer a number of questions.

This requires an interaction between values and facts, between ethics and biology.

A focus on fish welfare assumes that animals count in our moral deliberations.

Raises the question: what is moral status based on?
- sentience
- empathy
- awe
Thank you for your attention

Questions?