Fish Welfare: moving towards animal-based indicators
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- Low stress, aggression, injuries etc.
- Health: No diseases, parasites & good growth.
- Economy: Better quality product, Better income, Reduced production costs

Outline
- Input vs outcome indicators of welfare
- Welfare as a multidimensional concept
- Implementing animal-based indicators
- Keeping and sharing records

Good practices → good welfare
- It has long been known that good management practices reduce the risk of welfare problems
- But good management requires responding to almost continually changing situations
- We need indicators of when things are going well (or not) so that appropriate responses can be made

We need welfare indicators

Input
- Resources available (resource-based measures)
  - Space
  - Type of food
  - Temperature
  - Water quality

Outcome
Welfare – multidimensional concept

- Freedom from hunger and thirst
- Freedom from discomfort
- Freedom to express normal behavior
- Freedom from pain or distress

Farm Animal Welfare Council

Implementing animal-based (fish-based) indicators

- Pragmatic approach is to start with indicators that are important from both welfare and economic points of view
- Even better if these are already starting to be recorded

- Standardise WHICH INDICATOR to use
- Standardise WHAT TO MEASURE
- Standardise METHODOLOGY to be used

Welfare Quality®

Resources available
(resource-based measures)

Management practices
(management-based measures)

- Feeding
- Handling
- Inspection
- Transport
- Slaughter
- ...

Input

Outcome

Resources available
(resource-based measures)

Management practices
(management-based measures)

- Mortality
- Growth rate
- Health
- Swimming behaviour
- Ventilation rate
- ...

Input

Outcome

Resources available
(resource-based measures)

Management practices
(management-based measures)

Good practices, recommendations and legislation reduce the risk of poor welfare

How well are we succeeding?

Resources available
(resource-based measures)

Management practices
(management-based measures)

Indicate the animal’s welfare (welfare indicator)

Input

Outcome

Resources available
(resource-based measures)

Management practices
(management-based measures)

Good practices, recommendations and legislation reduce the risk of poor welfare

Good records indicating the actual level of welfare quantifies how well we have succeeded

Input

Outcome

Resources available
(resource-based measures)

Management practices
(management-based measures)

Good practices, recommendations and legislation reduce the risk of poor welfare

How well are we succeeding?
Example - Mortality
Seems simple – the fish is either dead or alive

BUT...
- Not all dead fish are found
- Fish may be culled
- Fish may die for different reasons, with different welfare implications

Example - Injury
Many reasons for a fish to be injured

BUT...
- Some injuries are actually deformities from larval stage
- Injuries may be on different parts of the body
- Classifying according to location and type of injury helps identify the potential cause

Example - Parasites
- Classify according to type or lifestage of parasite
- Level of infestation or proportion of fish affected guides treatment

Potential fish-based measures
- Mortality
  - Ratio of number found dead to number culled
  - Fish placed - fish remaining \( \times 100 \)
- Injury
  - Fin damage (which fin?)
  - Skin damage (where?)
  - Proportion of fish with each type of injury
- Parasites
  - Life stage or type of parasite
  - Minor, moderate or severe infestation (or number per fish)
  - Proportion of fish infested

Standardised methodology
- Proportion of fish sampled?
- How the sample is selected to be representative?
- How often is the fish-based measure to be taken?

Keeping and sharing records
- Facilitates benchmarking on the same facility over time
- Facilitates benchmarking between sites and regions
- Allows analysis to better understand the links between risk factors and their welfare consequences. Future development of industry
- Documents improvements in a convincing way to others
Use of antibiotics – an example of benchmarking

In the future the industry could produce similar graphs showing trends in fish-based welfare indicators

Summary

• Implementing the harmonised collection of standard fish-based indicators is a important next step for the industry.

• It will help improve management on site as well as be an important aspect of quality assurance for the industry.

• It is a necessary step for an effective health and welfare surveillance programme.