Reports and Comments

Welfare indicators for farmed rainbow trout: Tools for assessing fish welfare — FISHWELL handbook

This handbook — which is part of the FISHWELL project — looks to provide a fit-for-purpose tool for measuring fish welfare on the farm and reviews the welfare needs of rainbow trout at different life stages and the scientifically documented welfare indicators for them. As such, it follows the format of their handbook on salmon which was published in November 2018 (https://nofima.no/en/fishwell/) and featured in a previous report and comment (*Animal Welfare 28[2]*, 2019).

It is the product of a collaboration between fish welfare researchers and veterinarians at the food research institute Nofima, the Institute of Marine Research (IMR), the Norwegian Veterinary Institute (NVI), Nord University (all of whom are based in Norway) and the University of Stirling in the UK.

Each of the welfare indicators listed in the book — which they define as either operational (can be used on-site) or laboratory (more complex indicators that require analysis in a laboratory) — have been evaluated in terms of their relevance, usability, reliability and suitability for aquaculture.

The Report, which runs for over 300 pages, is split into three parts — the first part explains the concept of welfare as it relates to fish and their welfare needs and details the strengths and weaknesses of the different indicators of welfare in trout — whether direct animal- or indirect environment-based and when they should be used.

Part B deals with the actual practicalities and issues faced in different production systems — flow-through and seacages — and the application of the different operational welfare indicators to evaluate welfare in them. Knowledge gaps in these indicators for trout are highlighted, eg the optimal light conditions for rainbow trout (both light intensity and quality) in land-based flow-through systems is unknown.

Part C looks at the operational welfare indicators (OWIs) for different routines and operations, such as crowding, pumping, slaughter, transport, etc. Given the recent attention on them, the sections that deal with monitoring of welfare when developing and using new technology, specifically mechanical and thermal delousing, optical delousing and net cleaning, are likely to be of particular interest. The handbook identifies the need for all those developing and implementing such new technologies to ensure they are welfare-friendly and should adopt a 3Rs approach (Replace, Reduce and Refine) in their development. NB As is to be expected, many of the environmental, group and individual based OWIs are the same/repeated for each routine in this part.

Across the different systems and routines/operations the handbook suggests the use of a unified scoring system for diagnosing and classifying key external injuries. The 13 indicators cover injuries such as eye haemorrhage, opercular damage, emaciation, scale loss, fin damage etc, and pictorial examples are given indicating the level of severity (score 0–3). A scoring system covering internal changes caused by intraperitoneal vaccination — The Speilberg Scale — is also detailed.

As with the salmon handbook, this handbook should prove a very useful resource for those who farm trout or are interested in their welfare. The team involved in FISHWELL see the handbook as only the first part in a three-stage process; the second stage of which involves input from a wider range of stakeholders than scientists alone, eg NGOs, regulatory bodies, ethicists, industry and that focuses on auditing and interpreting data collected from the use of operational welfare indicators and the third achieving consensus and the development and adoption of robust assessment tools/protocols/standards across the industry.

Welfare Indicators for Farmed Rainbow Trout: Tools for Assessing Fish Welfare (May 2020). A4, 310 pages. C Noble, K Gismervik, MH Iversen, J Kolarevic, J Nilsson, LH Stien and JF Turnbull (eds). Available for download at https://nofima.no/fishwell/trout/.

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AWC Opinion on the welfare of cattle kept in different production systems

It has been over a decade since the Animal Welfare Committee (formerly Farm Animal Welfare Committee) last addressed the welfare of dairy cattle in 2009, whereas beef production was covered in a more recent (F)AWC publication from February 2019. In the latest Opinion Report from February 2021, the committee is looking at the welfare of cattle across the dairy and beef industries in the UK, including beef breeds born into dairy systems, up to the point of slaughter.

The Report is concentrated on the welfare aspects of two types of production systems: continuously housed cattle, and pasture-based systems, the latter referring to year-round grazing. However, at times, it is difficult to ascertain to what extent seasonal grazing (and by default seasonal housing) is included. Continuous housing (and therefore zero-grazing) is reported as being only a small minority (6%) of total dairy production in the UK. And, among the 94% of UK dairy producers that include grazing, only 3% give their herds access to pasture for fewer than three months.

Like a lot of animal welfare legislation following the UK's departure from the EU, the consequences of Brexit are not yet fully known. According to the Animal Welfare Act 2006 (England and Wales) and the Animal Health and Welfare Act 2006 (Scotland), causing unnecessary suffering to any domesticated animal is an offence, and anyone responsible for livestock should take all reasonable steps to ensure that the needs of the animals are met. There is also legislation in

https://doi.org/10.1017/S0962728600009337 Published online by Cambridge University Press

place that lists the specific animal welfare requirements to be fulfilled when different procedures are carried out, including ear-tagging, disbudding, dehorning and castration, whereas tail-docking of cattle is illegal. In preparation for updating current animal welfare legislation for cattle, the Report covers a range of areas related to the management of dairy and beef cattle under the two extreme ends of production systems, zero-grazing and outwintered herds. These two types of cattle management require different skills when it comes to stockmanship and pose different risks in terms of injury and disease.

Two of the subjects covered in the Report are worth mentioning in more detail, not least because they are animal welfare issues that belong to the more modern aspects of dairy and beef farming. These are the use of Precision Livestock Farming techniques to monitor the health and behaviour of animals in a herd, and the use of electric shocks to control animal movement.

Automatic monitoring of animal welfare

An important aspect of animal welfare is our ability to observe the animals in our care and intervene when necessary (and not intervene needlessly). One way to monitor cattle is via modern technology, the earliest example being the use of CCTV cameras which are increasingly being installed to aid stock supervision. However, more sophisticated techniques are now available. Most of these are aimed to help stockperson decisions, whereas some can replace the stockperson, both in terms of decisions and actions. An example of the latter is the automated covering of a feed trough in a milking robot to encourage a cow to exit at the end of milking.

Most dairy farms automatically record milk yields, which can be used to monitor sudden changes in the production of individual animals, indicative of potential health problems. But data can also be gathered from farm sensors and activity monitors, and capture (often real-time) information on animal weight, milk conductivity and composition, progesterone levels, body temperature, rumen pH, heart rate, environmental temperature, humidity and airflow, light levels, mass of feed offered and refused, feed quality, volume of milk consumed by calves, tail position and spatial positioning.

The Report emphasises the importance of automatic systems being properly designed and regularly monitored to ensure they are still fit for purpose. For example, gates programmed to permit access allowing cattle to choose when they are milked or when they access pasture can leave subordinate animals vulnerable to bullying by being left waiting for a long time for access to milking or food. Some simple welfare issues, such as dominant animals impeding access to milking robots, are likely to be more rapidly identified by a stockperson who is physically present. To safeguard animal welfare, the algorithms and decisions of electronic monitoring systems should be developed in consultation with welfare professionals. The Report clearly states that "Even in a highly automated environment, welfare remains a human responsibility."

Use of electric shocks to control animal movement

When it comes to cattle, we usually consider the use of electric shocks to control animal movement to be restricted to an electric fence, or the infrequent use of a cattle prod. The latter are permitted for use only as a last resort. However, the Report describes the inclusion in some milking robots of an electronic 'tickler', which applies a mild electric shock to induce cows to leave the robot if they have not departed after a certain time-period following milking. Regulations state that any bovine touched by an electric goad should be able to move forward, but the exit from milking robots is sometimes blocked by a dominant animal. So, unless there is direct human supervision, this would indicate that the use of electronic 'ticklers' in milking robots contravenes the existing codes.

The Report also notes that an electric fence is no longer always a metal wire strung between upright posts surrounding a grazing area. Electronic collars that can be fitted to cattle as part of a 'virtual fencing' system to control the movement of the herd are also commercially available. The collar works by emitting a warning sound when the animal approaches the virtual (invisible) fence line. If the animal does not stop, the collar applies an electric shock to the animal. Early systems necessitated a sensor line to be buried underground, but this has now been superseded by GPS technology. Virtual fencing could allow cattle to be contained outdoors in areas that are not easily fenced off. However, electronic fencing comes with a number of drawbacks, not least in terms of animal welfare. These include different animals learning the system at different speeds, with the risk that lack of failsafe mechanisms could lead to repeated shocks being applied until its battery expires. Currently, there is no requirement for the stockperson to record the number of times collars activate, whether correctly or otherwise. More worryingly, electrical collars are also beginning to be used in multi-paddock grazing systems where the animals are moved between small grazing areas, sometimes daily. Controlling pasture access without a stockperson needing to be present is likely to reduce the frequency of checking animals (although water troughs may still need to be physically moved) and interacting with them. As the precision of GPS increases, the use of these collars may become widespread unless regulated. The Report recommends definitions of technologies that apply an electric shock to animals (including goads, ticklers/trainers, motorised gates, motorised fences, and collars) to be clarified in a legal context, and that the use of electronic ticklers/trainers in milking robots and parlours should be reviewed. They conclude that "allowing an algorithm to determine when an animal should receive an electric shock for containment or feeding management purposes also requires ethical reflection."

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Additional remarks

Overall, the Report covers a broad range of issues to consider when assessing the welfare of cattle kept in these systems. As well as access to feed and water, these include behavioural aspects and factors affecting the comfort and mental state of the animals. The Report provides a comprehensive summary of these and other issues and although this is not its main purpose, it should be compulsory reading for anyone interested in cattle production. This includes beef and dairy farmers, politicians involved in legislation, journalists writing about current farming issues, and consumers interested in knowing more about how their food is produced. How many of us knew that a high-yielding dairy cow may drink up to 150 litres of water in a day? Or that the natural feeding position of a (grazing) cow, with one foot placed forward to facilitate downward reach, is impeded in indoor housing if the feeding trough is not close to the ground?

Many relevant issues are highlighted in the Report, and among the more noteworthy are recommendations and reminders that:

• Individual housing of calves should only take place in exceptional circumstances;

• Imported beef and dairy products should be from animals that have been farmed in conditions that meet UK welfare standards;

• Governments should legislate to phase out fully slatted floors;

• All stockpersons need to understand and be trained in welfare, which now includes engagement with relevant emerging indoor and outdoor technologies;

• Only breeds with appropriate physical and behavioural characteristics may be farmed;

• Governments should legislate to phase out tie-stalls;

• Bull pens designed for a single animal should be phased out; and

• The principle that animals are free to choose where to lie at any time should be promoted.

AWC Opinion on the Welfare of Cattle kept in Different Production Systems (2021). A4, 56 pages. Published by the Department for Environment, Food, and Rural Affairs (DEFRA), and available at https://www.gov.uk/government/publications/awc-opinion-on-the-welfare-of-cattle-kept-in-different-production-systems.

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https://doi.org/10.1017/S0962728600009337 Published online by Cambridge University Press