

REVIEWERS COMMENTS AND RESPONSES OF THE AUTHORS

COMMENTS TO THE AUTHORS

Editor Landbauforschung

As we fortunately came to the same conclusion of the value of your Position Paper, we will accept your manuscript, subject to minor revision. Please take into account the reviewers' recommendations, in particular the advice of Reviewer # 2 regarding the clarification of some statements, and write a short response to each of the comments. Please follow strictly the instructions for authors. The revised version of your manuscript will be evaluated again by the Chief editor and, if necessary, by the reviewers.

((Editor: Some comments of the two reviewers weren't mentioned in the responses of the authors – see here for completion))

Reviewer # 1:

General comments

The manuscript claims that welfare of fish is as important as welfare of terrestrial livestock, but that study and implementation of welfare in aquaculture is at an early stage compared to terrestrial farm animals. It is pointed out that fish is a very diverse group and that appropriate environments and procedures must be developed for each species rather than "fish", and factors that are assumed to affect welfare are listed and it is described how these should be dealt by developing protocols and procedures for the different farm species.

((Editor: For all other general comments and detailed comments see below in the responses of authors.))

None of the points made in the paper are novel, the need for more focus on fish welfare, different needs for different species and need for standardized protocols have been claimed before. However, the manuscript gives a fair and easily understandable description of these issues which could be useful for a broader audience that are not specialized in fish welfare. Furthermore, although the needs described here have been described before they largely remain unsolved, which makes it worth to keep focusing on them.

Recommendation

I recommend publication after minor revision.

Reviewer # 2:

Short summary of the aim of the paper, its main findings and conclusions

Due to an increasing production in aquaculture and an increasing consumer perception, welfare in fish has become more and more important. The text describes the points of discussion that arise again and again in relation to fish welfare and highlight possible solutions as mentioned in the research community.

General comments

The strengths of the paper lie in the neutral listing of facts on various welfare aspects.

((Editor: For all other general comments and detailed comments see below in the responses of authors.))

Short check if all conclusions are justified and supported by the results

The paper is very well written, both linguistically and grammatically, and has a meaningful, logical structure. Discussion points are illuminated from all sides and I could not find any missing aspects on this topic.

I miss the summary which of the proposals have already arrived in practice and are being implemented and in which areas more research is needed.

Short check if title, highlights and abstract are matching the scope given for the specific issue of Landbauforschung

The main topic of the article and its content fits mainly in the description of „position paper“ of Landbauforschung. It presents science-based opinions on a very important theme in aquaculture. Although this opinions and kind of text is not new (very similar articles published in Food Ethics, upcoming special issue and a special issue of “Haben Tiere Rechte” of the Bundeszentrale für politische Bildung), the theme is important.

Recommendation

minor revisions needed → insert citations!

REVISION – RESPONSES OF AUTHORS

“Position Paper: Lack of knowledge does not justify missing action: the case of consciousness, avoidance behavior, stress response and welfare in farmed fish”

Dear Ms. Rather, dear editorial board, dear reviewers

we appreciate your efforts in regards to our submitted manuscript and the constructive comments which were very helpful in increasing the quality of the manuscript. We would like to thank the reviewers for their suggestions and references, which have greatly helped to improve the overall quality of the article. Further their detailed views have helped to highlight the vast context of aspects related to animal welfare in aquaculture.

We have made several changes (traceable via track changes in the MS Word document) in reference to these comments in order to improve quality and readability of the manuscript.

In the following, we will point out the changes we made in regards to the reviewers’ suggestions.

Reply to Reviewer #1

General comments:

The topic of the paper fits well with the topic of the journal issue (Evolution in animal husbandry – Fitting animals or fitting systems?). However, the title of the manuscript does not give a good description of the content and should be changed.

Reply: We made changes accordingly.

Detailed comments:

1.) L10: *Please add a reference for these predictions.*

Reply: We added the according references for the predicted values.

2.) L28: *You could perhaps cite Braithwaite, Huntingford and van den Bos (2013, J Agric Environ Ethics DOI 10.1007/s10806-011-9355-x) here.*

Reply: We appreciate this very good matching reference for the section. However, unfortunately we have reached the limits of possible references of the journal.

3.) L31: *“certain fish species to be [...] avoidance learning...” Please rephrase.*

Reply: We have rephrased this section according to the suggestion from the reviewer.

4.) L72: *That the natural social structure is best for welfare is not always the case, at least not within what is practically possible for farming. For instance, salmon parr are naturally territorial in rivers. If held at low densities in tank they will be aggressive and harm each other. Relative high densities are probably better for salmon welfare, even if it is far from natural.*

Reply: The reviewer is right with his statement and the reference to salmon farming, which also holds true in many other species from the salmonid family. We have changed the sentence to reflect this.

5.) L76: *Yes, and also when other species than the main farm species is used as support, e.g. cleaner fish for parasite removal. For instance, the cleaner fish species used in European salmon farming, lumpfish and wrasses, have very different temperature preferences and tolerances, and much lower swimming capacity than salmon. See Hvas et al. 2018 (doi: 10.1242/bio.036079) and Yuen et al. 2019 (<https://doi.org/10.1016/j.biocontrol.2019.05.007>)*

Reply: This is a very good point and we have added this information to our manuscript. Thank you!

6.) L129-131: *I agree that indicators should focus on objective measures like injuries, physiology, health etc, but one must not forget that welfare is a mental state which is difficult or impossible to measure, and the indicators are used as they are assumed to reflect the mental state (it is the brain that experience welfare, a wounded fin or a low condition factor cannot experience anything).*

Reply: We appreciate this detailed commend.

7.) L142-143: *The first sentence here is a bit confusing, with the reference to Browman et al. 2019. What Browman et al. argue, as I understand it, is that when the society choose to include fish in the welfare legislation, it also involves costs (e.g. restrictions on fishing methods etc), and according to Browman and his coauthors it is questionable if the scientific evidence that fish can experience welfare is strong enough to justify the costs. This reference appears therefore to be in contradiction with what is said in the sentence.*

Reply: We were uncertain ourselves, whether it would be a good idea to take any citation into the conclusion or not, mostly for stylistically and conventional reasons. We have therefore excluded this specific citation from the conclusion section.

8.) L143-146: *The debate about whether fish are capable of experiencing suffering or pain is in fact mainly a debate about whether fish can experience anything at all, i.e. if fish have any level of consciousness, which is a prerequisite for pain (defined as an emotional experience of tissue damage). So the debate is not obsolete, but I agree that it should not only focus on pain and suffering but go beyond that and include the entire life quality of the fish, i.e. "can fish experience welfare or not?". This is possibly what the author(s) intend to say but it is not entirely clear so the text should be changed a bit.*

Reply: We agree with the reviewer, that consciousness is a prerequisite for pain, as defined in a human context. The reviewer is correct in the interpretation of our statement. Accordingly, and to make this point more easily understandable, we made respective changes to the text.

Reply to Reviewer #2

General comments:

Although the aspects correspond to the common and current scientific opinion from the field of welfare research in aquaculture, the - existing - scientific evidence is missing in the sections on possible solutions. This is a decisive weak point, as it must seem to the reader, who is not familiar with this field of research, as if it were all the author's own new ideas and proposed solutions. That is decidedly not so! In order to solve this, quotations from the literature must be inserted. Only very few statements are supported by quotations.

If the naming of numerous missing quotations would extend the scope of the paper too far, it must nevertheless be made quite clear that general statements are mentioned in this paper which are not to be attributed solely to the author.

Reply: We take this criticism very serious and are aware that multiple sections of the text should be quoted with numerous references. Unfortunately, this is not possible as it would massively exceed the scope of the paper and the guidelines of the journal.

We have added a statement before the section of possible solutions to clarify this:

'This article aims to give an overview by summarizing the common and current scientific opinion from the field of welfare research in aquaculture within the framework of this issue.' Page 4

General reply: We appreciate referring to the special issue of "Haben Tiere Rechte" of the Bundeszentrale für politische Bildung. The Book was released 16.09.2019. The manuscript was submitted 19.09.2019. Accordingly, we were unaware of this very recent publication which was released in the final stage of preparing the manuscript.

Detailed comments:

1.) Line 54: *"feed should be provided daily" and depending on the system adjusted several times a day.*

Reply: Thank you for this addition. We have added the information to the section.

2.) Line 144 to 146: *I agree with the author that the issues of pain and suffering must be considered independently of how a fish must be kept adequate to its biological needs. Nevertheless, it is not an issue that one should drop under the table, which is often done with pleasure, because it is a scientifically difficult to describe and understand topic. However, it has a very important ethical component. I would recommend to rephrase the sentence a little bit.*

Reply: A comment about this section was also provided by reviewer #1. We have tried to make our statement more easily understandable and change the section accordingly.

If you have any further questions please do not hesitate to contact me.

With best regards,

Vincent Lugert

FINAL ACCEPT

Editor/Chief-Editor Landbauforschung

Landbauforschung: Accepted

We are pleased to inform you that **we've accepted your revised manuscript "Position Paper: Lack of knowledge does not justify missing action: the case of animal welfare in farmed fish"**, which you submitted to Landbauforschung – Journal of Sustainable and Organic Agricultural Systems. Both reviewers agreed with us that the manuscript has significantly improved and that the revisions had been fulfilled.