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# Assessment of fish species' welfare state and welfare potential in farming

**FishEthoBase establishes ethological profiles of farmed fish species in order to provide a scientific basis to improve fish welfare.**

**Full profiles** represent and interpret all traceable findings from wildlife, lab and farm. But it takes much more time to cover all species farmed...

**Short profiles** on the other hand focus on 10 core criteria, scoring the findings in the way of a risk analysis along 3 dimensions:

- **Likelihood** of fish welfare under minimal farming conditions,
  - **Potential** of improving fish welfare, and
  - **Certainty** of the findings.
- The sums of "High" values in each of the 3 dimensions produce the **FishEthoScore**.

**Major results so far:**

- The short profiles yield a **sharp ethological assessment** of the welfare state and potential of a species.
- FishEthoScores across species differ remarkably, with **amazingly poor results for some of the most farmed species**, often in **contrast with the domestication level** of the species.
- The scores provide **advice for the choice of species**, suggest **focal points for improvements**, and **indicate research gaps**.
- The research carried out by the FishEthoBase proves to be a valid basis for **fish welfare consultancy in practice**.

## Short profile criteria

- 1. Home range:** Are minimal farming conditions likely to provide the home range of the species?
- 2. Depth range:** Are minimal farming conditions likely to provide the depth range of the species?
- 3. Migration:** Are minimal farming conditions compatible with the migrating or habitat-changing behaviour of the species?
- 4. Reproduction:** Is the species likely to reproduce in captivity without manipulation?
- 5. Aggregation:** Is the aggregation imposed by minimal farming conditions likely to be compatible with the natural behaviour of the species?
- 6. Aggression:** Is the species likely to be non-aggressive and non-territorial?
- 7. Substrate, shelter:** Are minimal farming conditions likely to match the natural substrate and shelter needs of the species?
- 8. Stress:** Are minimal farming conditions (handling, confinement etc.) likely not to stress the individuals of the species?
- 9. Malformation:** Are malformations of this species likely to be rare under farming conditions?
- 10. Slaughter:** Is a humane slaughter protocol likely to be available?

## Legend

- Li = Likelihood** that the individuals of the species experience welfare under minimal farming conditions
- Po = Potential:** overall potential of the individuals of the species to experience welfare under improved farming conditions
- Ce = Certainty** of the findings for Likelihood and Potential

High Medium Low Unclear No findings

- FishEthoScore:** sum of criteria scoring "High" (max. 10)
- Domestication:** scale from 1 to 5 (= fully domesticated), based on the research of Fabrice Teletchea et al. referred to in FishEthoBase
- Animals concerned:** number of farmed fishes killed annually, in millions per year (m/a), based on FAO data (2015) and on the research of fishcount.org.uk

## Selected short profiles in the order of the species' potential for fish welfare

Species	Li	Po	Ce	Domestication	Animals
<b>Oreochromis niloticus</b>	?			5	4,900-16,000 m/a
<b>Clarias gariepinus</b>				4	200-500 m/a
<b>Seriola lalandi</b>				2	no data
<b>Cyprinus carpio</b>	?	?		5	1,700-8,700 m/a
<b>Dicentrarchus labrax</b>				5	325-460 m/a
<b>Gadus morhua</b>				4	<1 m/a
<b>Salmo salar</b>		?		5	300-700 m/a
<b>Acipenser baerii</b>	?			5	1 m/a
<b>Salvelinus alpinus alpinus</b>				5	4-14 m/a
<b>Rachycentron canadum</b>				4	5-7 m/a
<b>Oncorhynchus mykiss</b>				5	200-3,700 m/a
<b>Sparus auratus</b>				5	400-600 m/a
<b>Scophthalmus maximus</b>				3	30-90 m/a
<b>Sander lucioperca</b>				4	1-4 m/a
<b>Acipenser naccarii</b>				4	no data
<b>Hippoglossus hippoglossus</b>				3	<1 m/a
<b>Polyprion americanus</b>				2	no data
<b>Pangasiodon hypophthalmus</b>				3	300-800 m/a

## The most frequent fish welfare problems observed when consulting aquaculture enterprises

As of 2018, **FishEthoBase** has been invited by the international certification scheme **Friend of the Sea (FOS)** to develop criteria for fish welfare in aquaculture, supported by **The Philanthropy Project**.

The approach chosen by FishEthoBase starts from the ground, **visiting FOS certified farms** around the globe to carry out a gap analysis, providing the farmers with **recommendations** on how they could improve the wellbeing of their fishes (so far, 17 enterprises with one or more farm visited, from January to May 2018).

In a second visit half a year later on the same farms, the researchers will collect the experiences of the farmers in implementing the such recommendations: What is **feasible**? Does it make a **difference** for the fishes? And will it be **checkable** by auditors?

Only on the basis of this experience FishEthoBase will provide **fish welfare criteria** to Friend of the Sea.

### Severity of the problem:

- High:** Welfare is directly affected (e. g. slaughter)
- Medium:** Welfare is potentially affected (e. g. monitoring and recording)
- Low:** Management issues (e. g. documentation)
- %** Quota of the visited farms having this issue

Most frequent FishEthoBase recommendations to 17 enterprises in IT, ES, HR, SI, TR after first visit
<b>88% Welfare training:</b> One staff member should be trained in fish welfare by an approved trainer.
<b>71% Humane slaughter:</b> A stunning and bleeding process to be immediately applied on fishes taken off the water.
<b>47% Environmental enrichment:</b> Establish easily removable shelter and environmental features.
<b>29% Record handling processes,</b> i.e. grading, transport, stripping, pre-slaughter, by a CCTV or a GoPro.
<b>24% Avoid stress:</b> No fish should be kept outside of the water for longer than 15 seconds.
<b>24% Visitor's control:</b> All visitors and deliverers of the site must register.
<b>18% Reproduction:</b> Apply natural spawning instead of manipulative methods
<b>18% Reduce crowding:</b> Assess and register frequency and duration of crowding each time.
<b>18% Monitor and record</b> fish welfare indicators (swimming and feeding behaviour, morphological examination).
<b>18% Hygiene:</b> Foot bath and wheel wash must be used on site, at least at the entrance.
<b>12% Mortality:</b> Net and cull any moribund fish on a daily basis, using a priest or an overdose of anaesthesia.