ANIMAL WELFARE OF FARMED FISH

Prof. Michail Pavlidis
University of Crete

Structure of the Presentation

1. Introduction
2. State of knowledge on fish welfare in aquaculture production
3. Animal welfare practices for farmed fish species
4. Regulatory framework for farmed fish welfare in the EU
5. Conclusions
6. Policy recommendations

1. Introduction

Aim of the study

To present factual information on:

- Scientific knowledge
- Regulatory framework
- Current practices and challenges

related to the welfare of the 5 most important farmed fish species reared in EU, under different production systems and at different phases of the life-cycle in captivity

1.1 Fish species under study

Atlantic salmon

(Photo: Robert F. Bukaty/AP)

Common carp

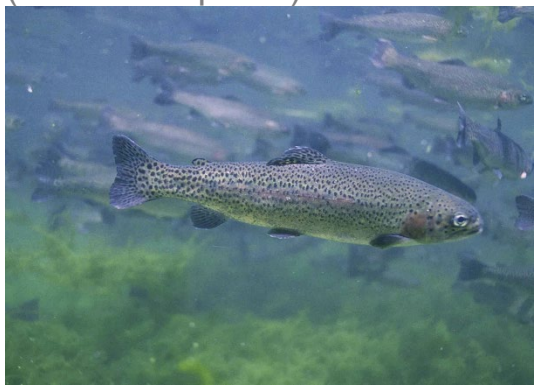
(Photo: www.ndow.org)

Gilthead sea bream

(Photo: Roberto Pillo)

Rainbow trout

(Photo: wikipedia)

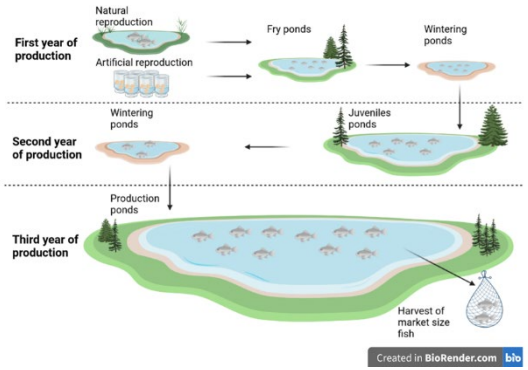


European sea bass

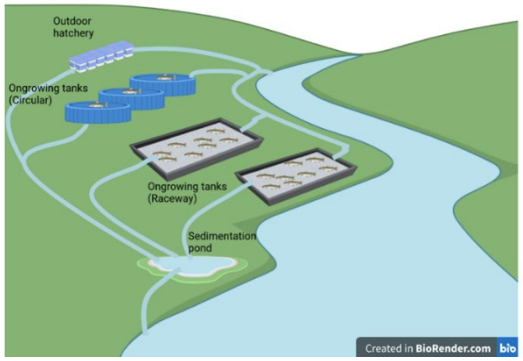
(Photo: https://ourmarinespecies.com)

1.2 Overview of fish farming systems

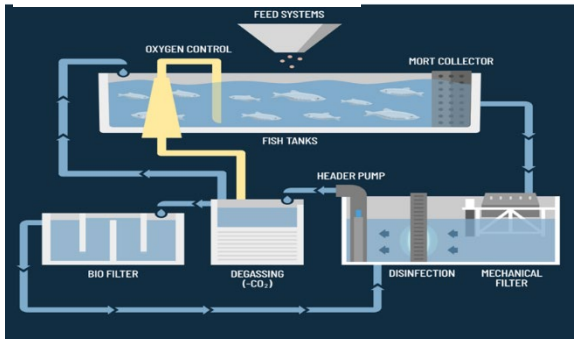
Pond culture



Land-based flow-through systems



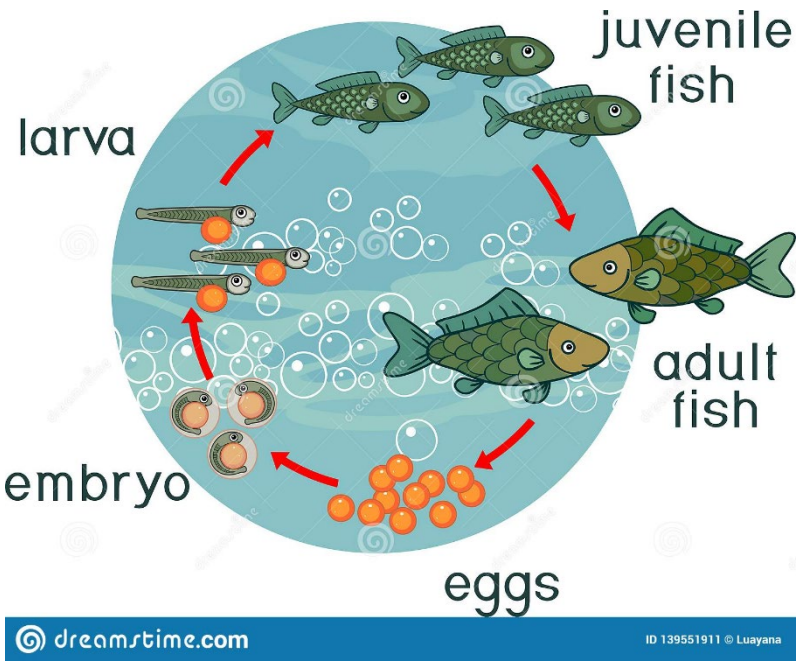
Recirculating Aquaculture Systems (RAS)

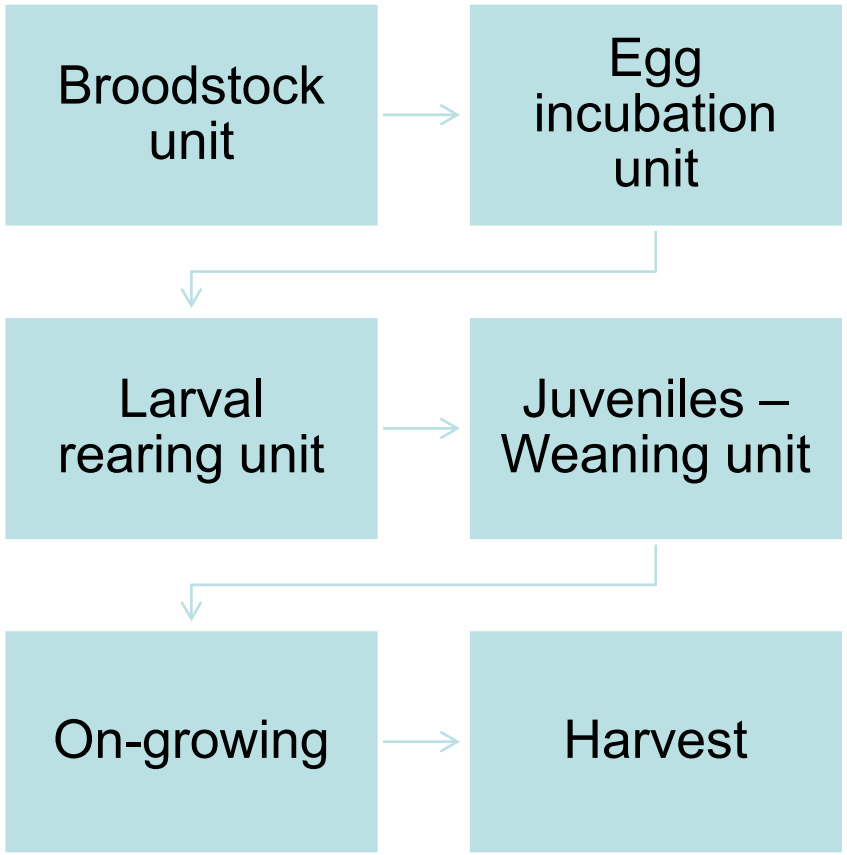


Open-flow floating cages

SWOT Analysis

1.3 Life cycle in captivity and production phases of welfare concern



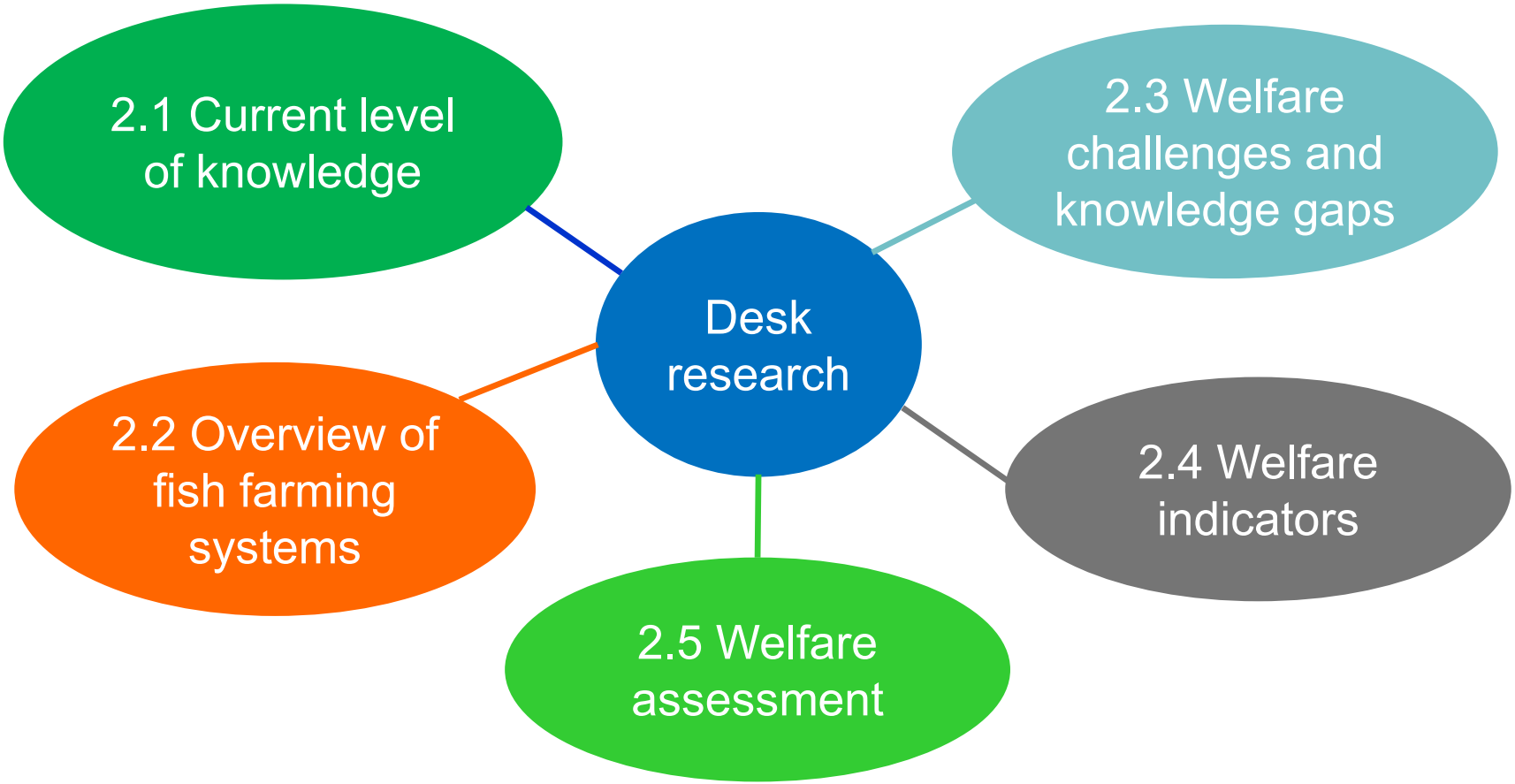


1.4 Case studies conducted

	Farmed species	Volume (t)	Percentage	Main farming type	Member State
1	Gilthead sea bream	77 300	13.8 %	Cages at sea	Greece, Spain, Italy
2	European sea bass	75 000	13.4 %	Cages at sea	Greece, Spain, Italy
3	Rainbow trout	46 600	8.3 %	Land-based open-flow tanks	Denmark, Italy
4		15 071	2.7 %	Land-based RAS	Denmark
5	Common carp	25 500	4.6 %	Ponds	Poland, Germany
6	Atlantic salmon	12 200	2.2 %	Cages at sea	Ireland

Total EU production (2018): 553 000 tonnes

2. State of knowledge on fish welfare in aquaculture production



3.1 Animal welfare practices for Atlantic salmon

1. Atlantic salmon is a relatively robust species and farmed salmon has become fit for aquaculture through **50 years of selection** of family groups.
2. **Handbooks** that provide welfare indicators and welfare assessment protocols for salmon **are available**.
3. Salmon farmed in flow-through tanks and sea cages have **low biosecurity**. Viral infections, algae and jellyfish blooms, gill amoeba, and sea lice are the **main causes of mortality** in salmon farms.
4. Need to provide **digital tools and standardised procedures** for identifying and monitoring **behavioural and other operational welfare indicators**.
5. Need to promote the **training** of veterinarians, health professionals and fish farm employees on fish welfare.

3.2 Animal welfare practices for rainbow trout

1. Rainbow trout is considered a **stress-sensitive species** in ordinary handling practices and operations compared to other European aquaculture farmed species.
2. Rainbow trout welfare is **vulnerable to challenges posed by climate change.**
3. Laboratory and farm operational **welfare indicators are available**, **but** assessment of intra-operational repeatability in fish welfare monitoring is still ongoing.
4. Stunning methods are established but operational indicators and **monitoring of stunning success** needs improvement.
5. **Training** of fish veterinarians, health professionals and fish farm employees on fish welfare is needed.
6. Further **research and investment** are needed to improve prevention and treatment of diseases and on-site behavioural welfare monitoring, especially of on-growing fish.

3.3 Animal welfare practices for common carp

1. Common carp is a **robust fish** species and its farming closely reflects its natural habitat conditions, nevertheless it is still sensitive with unique challenges for fish welfare, such as handling, predators and disease.
2. **Candidate welfare indicators** were proposed, for all life stages, apart from **larvae**, however their **practicability and usability are still under evaluation**.
3. Exposure of all life stages kept in the earthen ponds to **predators** (cormorant, otter) and diseases are of particular welfare concern.
4. Further **research** is needed for the development of welfare indicators and on-site behavioural welfare monitoring tools.
5. **Training** of fish veterinarians, health professionals and fish farm employees on fish welfare is needed.
6. Stunning methods are available, but operational indicators and **monitoring of stunning success needs improvement**.

3.4 Animal welfare practices for European sea bass & gilthead sea bream

1. E. sea bass is **a stress-sensitive species in ordinary handling practices and operations** compared to gilthead sea bream.
2. Further **research** is needed to identify **larval** biological requirements and optimum welfare conditions.
3. Further **research and investment** are needed for on-site **behavioural** welfare monitoring.
4. Development of a **scalable welfare score** and welfare standards is a high priority.
5. Provision of **welfare courses and training** for personnel is of high importance.
6. Development of **humane slaughter methods** is needed; stunning methods, prior to slaughter in ice-slurry, have been developed but are not in full operation due to the **high cost of investment**.

4. Regulatory framework for farmed fish welfare in the EU

- Legislation on the welfare of farmed fish is **poorly developed** and enforced compared to other farmed animals.
- A direct **EU law regarding** with concrete binding provisions on **fish welfare** (*not only generic principles and rules*) is still **lacking**.
- **Welfare codes of practice** shall be developed by **producer organisations or associations** and submitted for approval to the competent authorities.
- The **competent authorities** would then verify that the codes of practice are **in line with the principles of legislative framework** for fish welfare, and the verified codes of practice would be enforceable and obligatory for members of producer organisations and associations.

5. Conclusions (I)

1. All farmed fish have **common welfare needs**, such as adequate nutrition, proper water quality, good health/fitness, behavioural freedom, and safety. However, **different lifestyles, species-specific differences in stress tolerance and disease resistance, and individual differences** within species should all be considered when assessing welfare status and husbandry practices at the different production systems.
2. Further research and technological advances are required to develop **valid, repeatable, reliable, and usable by farmers and regulatory authorities welfare indicators** and methods to assess fish welfare on site in an impartial manner.

5. Conclusions (II)

3. The published literature critically evaluates common practices and operations of concern for welfare, such as handling, grading, transportation, anaesthetisation, and stunning/slaughtering. However, **further research is needed on several other practices and daily/routine operations**. Moreover, in specific cases, **there is a lack of rules in place to manage welfare risks**.

4. Legislation on fish welfare has to be linked to the legal frameworks in place regarding **feed** ingredients, aquatic animal **health**, aquatic animal **traceability**, **veterinary treatments** applied, as well as **farm hygiene** and **biosecurity**.

6. Policy recommendations
(I)

1. Encourage scientific, ethical and public **debate** and support multi-disciplinary **research** on fish welfare.
2. Support research on the characterisation of **welfare needs and standards**, for farmed fish species in different farming systems and production phases, especially during **early development** and at **harvest**.
3. Support research on the development of **technological tools** to monitor and analyse fish **behaviour** on-site.
4. Support research on the development of reliable and user-friendly **operational welfare tools** for the assessment of welfare.

6. Policy recommendations (II)

5. Support the development of **species-specific welfare scoring systems** to ensure welfare assessment by fish farmers on-site and evaluation of farmed fish welfare status by the competent authorities.
6. Emphasise on the development and implementation of **humane slaughter methods**.
7. Develop and promote fish welfare **training courses for veterinarians** and health professionals who specialise in fish to support fish farm staff.
8. Develop and promote **basic training programmes for fish farmers** to provide fundamental knowledge on fish biology and behaviour, relevant EU and national regulations and standards, husbandry procedures that can cause suffering, and good husbandry practices leading to improved fish welfare.

6. Policy recommendations (III)

9. Develop and promote **life-long education and training of fish farm personnel** to certify that staff responsible for the care of fish is competent, well-trained and have management skills appropriate to the technical requirements of the farming system and production phase.
10. Nominate a **welfare officer** for each fish farm. The person in charge must safe-guard that fish welfare needs and the implementation of fish welfare recommendations are taken care of. The welfare officer is responsible for preparing all relevant documentation for the competent authorities (annual report on fish welfare related outputs, including mortalities, injured animals, and disease outbreaks).
11. Develop **support measures for the industry** to incorporate recent technological advances in welfare monitoring and humane slaughter.

6. Policy recommendations (IV)

12. Improve the **legislative framework** on animal welfare, for example through amending Directive 98/58/EC, with clearly defined provisions to avoid suffering, pain, and distress of fish in farming operations, focusing also on fish welfare and incorporating the latest scientific advances in this field. The updated legislation should include:

a) the fundamental legislative **objectives** and general **fish welfare principles**,

b) the delegation of authority and establishment of enforcement and **official auditing mechanisms**, and

c) the framework for the development of secondary legislation on areas such as **management**, **handling/treatments**, **transportation**, and **slaughter**.

13. Incorporate **species-specific requirements** as annexes of secondary law on **animal welfare** and/or promoting the development of codes of good practice by interested parties (i.e. producer organisations).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