FEDERATION OF EUROPEAN AQUACULTURE PRODUCERS

FISH BREEDING AND GENETICS FOR AQUACULTURE'S CONTRIBUTION TO EU SUSTAINABLE FOOD SYSTEMS AND ACHIEVING UN SDG

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FEAP membership

- Composed of national fish farming associations representing **24 national associations** from **23 countries.**
- European wide, not only EU.
- Salmon, rainbow trout, seabass & seabream, turbot, sole, meagre, sturgeon/caviar, arctic char, carp, eels, (and more).
- Each year:
  2,5 million tonnes of nutritious, safe, delicious and environmentally sustainable fish.

Some basic information about aquaculture

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- Worldwide growth in demand for fish and improvements in production systems have driven the rapid expansion of aquaculture, making it the world's fastest growing food production sector.
- Today, total global production of aquatic products for human consumption exceeds that of capture fisheries and these products are some of the world's most traded food commodities.
- A growing population (est. 9.8 billion by 2050) presents major challenges to ensure food security in the face of an expanding demand for food and against a background of limited natural resources and climate change impacts.

Aquaculture for the future

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- Given the acknowledged nutritional benefits of fish and other aquatic products, aquaculture is destined to play an increasingly vital role in supplying food from seas, rivers and lakes, providing a source of healthy diets and livelihoods for millions of people, while alleviating pressure on wild stocks (FAO dixit).
- Aquaculture production has the potential to contribute to the achievement of the Sustainable Development Goals, especially SDG 2 (Zero hunger) and SDG 14 (Life below water).
- Europe does not lead world aquaculture production in tonnes, but it does in technology, efficiency and environmental sustainability.

Aquaculture genetic resources

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- While aquatic genetic resources constitute an invaluable reserve of biodiversity, they remain largely unexplored. Globally, we currently farm almost 600 aquatic species.
- Farmed aquatic species include finfish, molluscs, crustaceans, vascular and non-vascular plants, and microorganisms.
- For many of these organisms the production cycle depends on exploitation of their wild counterparts: wild relatives of many aquatic genetic resources are collected from their natural environment to be bred or raised under farm conditions.
- Consequently, the aquaculture sector remains today closely linked to wild aquatic genetic resources and their habitats.

Genetic technologies applied to farmed aquatic species

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- There is a greater range of genetic technologies that can be applied to aquatic species than is generally possible for terrestrial livestock.
- In aquaculture, traditional approaches of selection, hybridization and crossbreeding can be applied, but there are also means of readily manipulating ploidy and sex.
- Notably, the first transgenic animals produced for commercial food production were fish. (Note, however, that the FEAP does not support the production of transgenic fish).
- Farmed aquatic species have significantly larger reproduction rates than terrestrial livestock.

Genetic technologies applied to aquaculture

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- Some technologies can be used for immediate short-term gain, whereas others are for longer-term gain, with genetic improvements accumulating each generation.
- Although new gene-editing techniques are emerging that can be applied to cultured species, they have not yet been widely applied in commercial aquaculture.
- The basic requirement for the application of all genetic technologies is the ability to reproduce the species under controlled conditions, i.e. under farm or hatchery conditions.

Extent of the use of genetics in aquaculture

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- Genetic improvements in traits by selective breeding produce genetic gains of about 10 percent per generation.
- Aquaculture geneticists have stated that if all farmed aquatic species were in traditional selective breeding programmes, improvements in aquaculture production efficiency could produce a doubling in aquaculture production by 2050, thus meeting the projected increase in demand for fish and fish products with a low proportional requirement for additional land, water, feed or other inputs.

Challenges for aquaculture breeding and genetics

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- Building knowledge and facilitating access to that knowledge is essential to raise awareness and address the main needs, advantages and challenges for aquaculture breeding and genetics.
- Challenges:
  - Accelerating the genetic improvement of key aquaculture species.
  - Developing and promoting effective access and benefit-sharing measures.
  - Addressing threats to the natural reservoirs of diversity of wild relatives of farmed species.
  - Improving (or implementing) well-designed and integrated conservation programmes.
  - Supporting the development of adequate governance systems.

Objectives of fish breeding and genetics in aquaculture

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- Genetic technologies can be applied in aquaculture for:
  - Increased production.
  - Control of reproduction.
  - Improved marketability.
  - More accurate and effective traceability in the supply chain.
  - Better disease and parasite resistance.
  - More efficient utilization of resources.

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WE ARE **THE SOLUTION**

WE ARE **THE FUTURE**

Thank you for your attention

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