



AQUAGENOME

Genomics in fish and shellfish from research to aquaculture

The Challenge

In recent years, a relatively large number of projects investigating the biology of aquaculture species through genomic approaches have been funded both at national and European level. These have generated an extensive core of genomic tools and expertise that is spread among European research laboratories. However, this scientific resource has not been coordinated within research, and transfer to the European aquaculture industry is still in its infancy. If aquaculture is to attain its full potential, this scientific knowledge and expertise must be transferred to industry as soon as possible.

The research domains of interest include; studies of immune system and pathogenic agents as well as vaccine development and side-effects of vaccines; population genetics, genotyping and marker assisted selection; chronic stress and genomics of environmental adaptations in farmed species; sex differentiation, puberty and broodstock management; early development and feeding as well as metabolism toxigenomics.

Project Objective

The objectives of AQUAGENOME were:

- to coordinate the ongoing and future national and international research projects in the field of genomics in fish and shellfish European aquaculture and support diffusion of genomic approaches within research laboratories; and
- to enhance the transfer of information and knowledge towards the aquaculture industry.

Key Points

- To make an inventory of existing genomic resources and identify and evaluate new bioinformatic resources, genomic information and tools which are vital for the development of European aquaculture.
- To identify specific research domains in which genomic approaches should be developed in order to support the European aquaculture industry.
- To support exchanges of scientists and genomic resources between members of the created AQUAGENOME Associated Partner Network.
- To determine the required actions to apply genomic tools and knowledge in an effective and sustainable manner in aquaculture, by interacting with producers and stakeholders.

EATiP Thematic Area of Relevance

- TA1: Product Quality, Consumer Safety and Health
- TA2: Technology and Systems
- TA3: Managing the Biological Lifecycle
- TA4: Sustainable Feed Production
- TA5: Integration with the Environment
- TA6: Knowledge Management
- TA7: Aquatic Animal Health and Welfare
- TA8: Socio-Economics and Management

Key Words

Genomics, Industry, Aquaculture

Project Information

Contract number:

44481

Contract type:

Coordination action

Action line:

POLICIES-1.3 The modernisation and sustainability of fisheries policies

Duration:

24 months (01/01/2007 – 31/12/2008)

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Output Highlights

Mobility Grants

The project offered a number of grants aimed to support short term mobility for PhD students and young researchers. The project allowed the transfer of expertise among existing aquaculture related genomic resources. A database identifying scientists and genomic resources/tools generated for aquaculture through previous European and National projects was created. This was necessary to avoid repetition and overlap of projects and indirectly improve economic efficiency of R&D.

New technology

A software tool – Phylosig was developed for use by researchers and the scientific community in order to overcome problems of gene annotation for aquaculture species of relevance for breeding and selection.

Technical Handbook

In the area of RTD the development of benchmarks for genomic activities was undertaken and standards defined. A technical handbook was developed to improve the awareness on 'Best practise' and 'Best available technology' of genomic tools.

Identifying State-of-the-art

A state-of-the-art and the future of genomics in aquaculture research documented the knowledge gaps and need for further genomic tool development as well as suggestions for future research and resource development at the European level based on the state-of-the-art within each research topic. The application of genomics to husbandry, growth, health and welfare and environmental monitoring in aquaculture were discussed.

Knowledge transfer

Workshop on "Towards applications of genomics in European temperate and Mediterranean aquaculture", was organised.

White Paper

A state-of-the art and the future vision of how genomics can benefit European Aquaculture was developed into a White Paper on Genomics which was submitted to the European Commission and other stakeholders at the end of the project.

The Full Report:

For a comprehensive description of the research project, visit <http://genomics.aquaculture-europe.org/>

Next Steps – Suggested Actions/Follow On



RTD

- The benchmarking activity in the project proposal did not have sufficient funding and had to be scaled back.
- The targeted application of research results can be used to improve the nutrition of aquaculture animals and their resistance to pests, parasites and disease. This will ensure that in future the appropriate methods are chosen and waste is eliminated.
- The development of a technical handbook will raise industry awareness and understanding of genomics methods and help them to evaluate possible processes which would benefit from genomics approaches. The improved knowledge and application of current genomic research findings will optimise European aquaculture and contribute to a sustainable future.



Policy

- The white paper generated during the project is another source of future research as priorities have been highlighted. The project outcome will inform future debate and decisions surrounding animal welfare and the ethics of aquaculture.



Knowledge Transfer

- There is an obvious need for the application of knowledge and transfer of genomics technology to industry.

Related Publications/Projects

AQUABREEDING