



Aquainnova

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## 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

Functional genomics, molecular tools, integration, aquaculture, fish

## Project Information

**Contract number:**

22685

**Contract type:**

Specific Support Action

**Action Line:**

POLICIES-1.3 The modernisation and sustainability of fisheries policies

**Duration:**

24 months (01/11/2005 – 31/10/2007)

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<http://genomics.aquaculture-europe.org/>

# AQUAFUNC

**Integrated knowledge on functional genomics in sustainable aquaculture**

## The Challenge

Under the EU's Fifth and Sixth Framework Programmes Research (FP5 and FP6) several projects used molecular technologies and functional genomics approaches to improve sustainability of European aquaculture. These projects covered a broad range of aquaculture species and problems and led to the generation of molecular tools of utility in diverse research areas - such as growth, stress, reproduction, immune function and disease resistance. However, maximising the benefit derived from these disparate efforts requires a careful integration of project outcomes.

FP5 and FP6 bridged a period of exceptionally rapid progress in molecular technology associated with a number of large-scale sequencing projects. These molecular technologies have become so routine that the use of gene mapping and a functional genomics approach are now widespread in aquaculture research.

## Project Objective

The overall aim of the AQUAFUNC project was to integrate the outcome of projects funded in FP5 and FP6 and to generate a common scientific basis of a functional genomics approach to aquaculture and to allow better exploitation and dissemination of the resources generated.

## Key Points

During a two day working group meeting attended by 37 participants from 17 EU-funded projects and 4 national projects an overview of functional genomics applied to aquaculture in Europe was generated. The meeting formed the basis of a collection of ten scientific review articles, the preparation of which brought aquaculture researchers from diverse fields together. The articles cover the following areas:

- Genomic tools for fish culture: status and perspectives
- Genomics of fish sex determination and sex differentiation
- Functional genomics and proteomic approaches for the study of gamete quality in finfish aquaculture
- Functional genomic approach to the brain-gonad axis and puberty of fish in aquaculture
- The molecular and endocrine basis of flatfish metamorphosis
- Towards fish lipid nutrigenomics: current state and prospects for finfish aquaculture



- Functional molecular aspects of lipoprotein metabolism in fish and shellfish
- Functional genomics and stress responses in aquaculture fish
- The molecular basis of diseases and immune function of finfish in aquaculture
- Molecular biology, genomics and the study of diseases and immune system in bivalves

## Output Highlights

### State-of-the-art

The integration of the outcome of projects using functional genomics and related technologies in scientific publications elaborated by the project members highlight the state of the art and integrate the outcome of various projects on stress, disease, nutrition, larval development and molecular genetics and these are published in a dedicated issue of Reviews in Fisheries Science - Scientific community, state-of-the-art reviews on several aspects of the use of functional genomics in aquaculture

### Dedicated website

All information gathered and all printed material produced during the AQUAFUNC project was gathered and disseminated through the AQUAFUNC web page. The web page is still running as it was “inherited” by the follow up project: AQUAGENOME open web page on the integration of the outcomes from EU funded project of FP 5 and 6 directed towards improving sustainability of European aquaculture by developing molecular technologies, gene mapping and functional genomics approaches.

### Information gathering

AQUAFUNC aimed to integrate the outcome of all FP 5 and 6 projects on the use of functional genomics in Aquaculture so as to identify specific needs in this area, to reduce repetition now and in the future and prepare the foundation by integrating previous investment and investigation in this area. The integration of the outcome of projects using functional genomics and related technologies was seen as an essential step and contributes significantly to building a common knowledge base in this area.

### The Full Report:

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

## Next Steps – Suggested Actions/Follow On



### RTD

- Integrating the outcome of projects utilising functional genomics and related technologies is undoubtedly a logical step. It will facilitate the building of a common knowledge base and more efficient resource sharing in these fields of research. Integration should have a number of positive effects, as it is expected that the synthesis of a larger data set will have a synergistic effect and give a more significant output.



### Knowledge transfer

- In addition, integration and communication of the different projects outcome would reduce research overlaps in the future. Finally, bringing together a large number of research groups and projects in a common forum should generate a critical mass and improve European and International visibility in this important area of production.

## Related Publications/Projects

- K.S. Sundell, D. Power, P. Prunet and A. Figueras, Reviews in Fisheries Sciences, 2008, The use of molecular methods and functional genomics in aquaculture.
- AQUAGENOME is the follow on from the AQUAFUNC project and will develop a “road map” for European research in aquaculture, will bring more interested parties into the forum (producers as well as the consumers) and develop initiatives for training and implementation.