

BALCOFISH, Annual report, Year 1, 2009

January 29, 2010. Lars Förlin

1. Gained scientific results during the reporting period.

In the Balcofish project the work is divided in six WPs. Below is reported results subdivided into these WPs:

WP1. Provide a data matrix on contaminant levels, effects and population descriptors in eelpout, and supporting environmental variables from Baltic coastal waters

WP2. Develop new tools for studying effects of contaminants on eelpout in the Baltic Sea

WP3. Apply existing and new tools in field studies of eelpout in contaminated coastal sites in the Baltic Sea

WP4. Confirm laboratory studies and validate extrapolations between species

WP5. Link gene responses to population effects

WP6. Bridge the gap between scientists, stakeholders and managers

WP1. Provide a data matrix on contaminant levels, effects and population descriptors in eelpout, and supporting environmental variables from Baltic coastal waters.

Task 1.1 Deliver existing data and access to ongoing monitoring activities applying biomarkers and reproduction parameters to eelpout in Baltic coastal waters.

Comment: The existence of data on biological effects in eelpout has been identified by BALCOFISH partners. Most important right now is the BonusHAZ Report Format in Excel with a coupled Access database including a brief “user manual”. A few “test riders” have tried to use it and they had minor comments, so it should be usable for “the masses” by now! The report format has been sent out to all partners of Balcofish. It has its own e-mail address; Bonushaz@dmu.dk.

Task 1.2. Developing a data bank and relevant and quality assured information

Comment: Work in progress as planned. The database is named “BONUSHAZ”. It has from the beginning been intended to utilise the ICES code lists as a foundation for data exchange and consistency between institutes. As of 2010 we have made a formal arrangement with ICES so we can use their code lists from their RECO database

<http://www.ices.dk/datacentre/reco/reco.asp>

This is a good step. This also means that ICES knows the existence of the Balcofish project, and they are interested in helping so data can be submitted to them at a later stage. At present these code lists are being implemented in the BonusHAZ structure

WP2 Development of new tools for studying contaminants effects in eelpout in the Baltic Sea

Task 2.1 Development of gene expression assays to analyze eelpout from various coastal sites.

Comment: A first paper about the transcriptome sequencing and the development of an oligonucleotide microarray for eelpout has now been published (Kristiansson et al., 2009). We have optimized both primers and hybridization conditions to obtain an excellent oligonucleotide microarray platform for our eelpout gene expression studies. Results from this work have been presented at scientific meetings and courses (see task 6.5 and 6.6)

Task 2.2 Population genetics in different Baltic eelpout populations.

Comments The progress of work is according to plans.

Task 2.3 Development of sex specific genetic markers in eelpout.

Comment: The work in this task is planned to start after year 1.

WP3 Applying existing and new tools in field studies of eelpout in contaminated coastal sites in the Baltic Sea

Task 3.1 Contaminant /congener patterns in fish from various coastal sites.

Comment: A postdoc, Jenny Hedman, has been recruited and started in August 2009. It has been suggested a list of prioritised contaminants which form the basis for chemical analyses and controlled laboratory exposure experiment. Compilation of literature data about eelpout and writing of a review has started.

Task 3.2 Monitoring biomarker responses in eelpout from different coastal sites.

Comment: Two large sampling campaigns with eelpout have been performed. In May 2009 including four sites in Sweden, five in Denmark and three in Germany, and in November 2009 seven sites in Sweden, four in Denmark and three in Germany.

Task 3.3 Larvae malformation and pathology in eelpout.

Comment: In this task samples were taken at the same two campaigns indicated in task 3.2 (above).

Task 3.5 Population genetics in different Baltic eelpout populations.

Comment: In this task samples were taken at the same two campaigns indicated in task 3.2 (above).

Task 3.6 Application of gene arrays in eelpout in different Baltic populations.

Comment: As a pilot study the eelpout oligonucleotide microarray (see task 2.1) has now been used in the first large scale gene expression analysis on eelpout where we compare one reference site to a polluted site (Asker et al. in preparation). In this study we find genes upregulated e.g. during apoptosis, in response to oxidative stress and drug metabolism. Results have been presented at scientific meetings and courses (see task 6.5 and 6.6). We will now expand the gene expression studies and include eelpouts from the two sampling campaigns indicated in task 3.2. Oligonucleotide microarrays will mainly be performed on the November 2009 samples.

Task 3.7 Comparative studies with stickleback in different coastal sites in the Baltic.

Comment: The stickleback experiments were originally planned to start year 2 but the stickleback were sampled in some of the sites where eelpout were sampled in May 2009 (as indicated in task 3.2).

Task 3.8 Comparative studies with flounder in different coastal sites in the Baltic.
Comment: This work is planned to start year 2.

WP4 Confirming laboratory studies and species comparison

Task 4.1 Laboratory exposure studies using three-spined stickleback.
Comment: Laboratory experiment with stickleback is planned for year 2.

Task 4.2 Laboratory exposure studies using zebrafish.
Comment: Zebrafish have been exposed to mixtures of flame retardant and perfluorinated chemicals. Report is under preparation.

WP5 Linking gene to population

Task 5.1 Individual-based population dynamic model for eelpout.
Comment: A postdoc, Sara Bergek, has been recruited and started in September 2009. A frame for the eelpout population model work has been created and identification of relevant and existing data is compiled.

WP6 Bridging the gap between scientists, stakeholders and environmental managers

Task 6.1 Environmental assessment tools for biological effects in eelpout.
Comment: Work in progress.

Task 6.2 Workshops in conjunction with field sampling campaigns and coordination meetings.
Comment: Below is listed workshops held within the project:

Workshop in October 2008 in Gothenburg. This was a pre-Balcofish meeting when plans were refined and adjusted according to the budget.

Workshop in January 2009 at the BONUS+ kick-off.

Workshop in March 2009 in Gothenburg. This was the first Balcofish steering committee meeting. At this meeting were the first year activities planned in more detail, especially the first sampling campaign in May 2009, the Berlin eelpout meeting and practical eelpout meeting in Denmark.

Workshop in September 2009 in Berlin. This steering meeting was held in conjunction with the UBA organised eelpout meeting. At the steering meeting also coordinator for the BONUS+ project Beast attended.

Workshop in Sominstation in October 2009 near Roskilde in Denmark. At this very successful practical workshop both Balcofish and Beast partners attended. Important issues were discussed in details concerned standardisation of methodology for sampling and dissection, and for assessing reproductive success, and common databank for Balcofish and Beast.

Task 6.3 Retrospective analyses of existing contaminants data in eelpout stored in biobanks
Comment: The work in this task is planned for year 2. The suggested list of priority contaminants and the work started with compiling literature data about eelpout and a review paper as indicated in task 3.2 is relevant also here.

Task 6.4 Workshops for scientists and environmental managers,

Comment: At the “Eelpout monitoring workshop”, organized by the German Federal Environment Agency (UBA) the Balcofish project was presented. Monitoring activities with eelpout and other organisms in Denmark, Sweden and Germany related to the Balcofish project were also presented by several Balcofish members. The following presentations were given:

- *Results from eelpout monitoring at the German coast.* Jens Gercken, Institute for Applied Ecology Ltd
- *Eelpout monitoring in Sweden.* Lars Förlin, University of Gothenburg
- *Eelpout monitoring in Denmark.* Jakob Strand, National Env. Research Institute
- *The Balcofish Project.* Lars Förlin, University of Gothenburg
- *Molecular Biomarkers.* Joakim Larsson, University of Gothenburg

Task 6.5 Special session at SETAC conference

Comment: At the SETAC international meeting in Göteborg, May 2009, monitoring data with links to Balcofish were presented both in oral and poster presentations. Lars Förlin was chairman at the platform session “Fish health and integrated monitoring” which included the presentations below:

Oral presentation

Monitoring of the viviparous fish species eelpout (Zoarces viviparus) indicates environmental changes in coastal waters. Lars Förlin, Joachim Sturve, Jari Parkkonen, Erik Kristiansson, Noomi Asker, Joakim Larsson. University of Gothenburg, Sweden

Poster presentations

Frequent occurrence of gonadal disorders in eelpout from German coastal waters. Jens Gercken¹, Markus Quack², Jan Koschorreck³, Holmer Sordyl¹.
¹Institute for Applied Ecology Ltd., BRODERSTORF, Germany. ²University Trier, TRIER, Germany. ³Federal Environment Agency, BERLIN, Germany

Characterization of the Zoarces viviparus liver transcriptome using massively parallel pyrosequencing. Erik Kristiansson, Noomi Asker, Lars Förlin, Joakim Larsson. University of Gothenburg, Sweden

Multi-endpoint studies on the eelpout (Zoarces viviparus), using gene expression oligonucleotide microarray. Noomi Asker, Erik Kristiansson, Joakim Larsson, Lars Förlin. University of Gothenburg, Sweden

Task 6.6 Disseminate data at meetings on endocrine disruption, ecosystem health and coastal fisheries.

Comment: Below are listed dissemination activities related to Balcofish at scientific meetings, meetings with stakeholders as well as teaching in courses given to undergraduate and graduate students.

HELCOM Project for Expert Network on Monitoring and protecting of Coastal Fish and Lamprey Species (HELCOM FISH 2/2009), Tallin Estonia. January 2009:

Danish monitoring activities with links to the Balcofish project. Jakob Strand, National Environmental Research Institute, Denmark.

15th international symposium on Pollutant Responses in Marine Organisms (PRIMO) in Bordeaux, France, May 2009:

Studies of the eelpout (Zoarces viviparus) indicate environmental changes in coastal waters. Lars Förlin, Joachim Sturve, Jari Parkkonen, Inger Holmqvist, Erik Kristiansson, Noomi Asker, Joakim Larsson. University of Gothenburg, Sweden

Characterization of the Zoarces viviparus liver transcriptome using massively parallel pyrosequencing. Erik Kristiansson, Noomi Asker, Lars Förlin, Joakim Larsson. University of Gothenburg, Sweden

Multi-endpoint studies on the eelpout (Zoarces viviparus), using gene expression oligonucleotide microarray. Noomi Asker, Erik Kristiansson, Joakim Larsson, Lars Förlin. University of Gothenburg, Sweden

Workshop “Fish health and biodiversity in the Baltic Sea”, Kaliningrad, November 2009:

Swedish fish monitoring programme. Lars Förlin, University of Gothenburg, Sweden

The Balcofish project. Lars Förlin and Leif Norrgren. University of Gothenburg, Gothenburg, and University of Agricultural Sciences, Uppsala, Sweden

ICES Working Group of Biological Effects of Contaminants (WGBEC), Weymouth, England. 16-20 March 2009.

BALCOFIS – a BONUS+ project in the Baltic Sea. Jakob Strand, Aarhus University, National Environmental Research Institute, Denmark

15. danske havforskermode, Helisong, Denmark, January 2009.

PAH biomarkers in the eelpout from Danish waters. Zhanna Tairova, Jakob Strand, Aarhus University, National Environmental Research Institute, Denmark.

HELCOM HAZAS meetings, autumn 2009

Contribution with report text and data on biological effects in eelpout in the Baltic Sea, In: Chapter 2.3 Biological effects of hazardous substances: status and trends, In: HELCOM thematic assessment of hazardous substances, Draft report (HELCOM HAZAS). Jakob Strand, Aarhus University, National Environmental Research Institute, Denmark

9th Swedish Bioinformatics workshop, University of Umeå, Sweden

Oral presentation

Large-scale gene expression analysis in non-model organisms – de novo transcriptome sequencing and microarray design.

Kristiansson, E., Asker, N., Förlin, L., Larsson, DGJ. University of Gothenburg, Sweden

Poster presentation

*Characterization of the *Zoarces viviparus* liver transcriptome using massively parallel pyrosequencing.* Kristiansson, E., Asker, N., Förlin, L., Larsson, DGJ. University of Gothenburg, Sweden

Courses and lectures where materials with links to the Balcofish project have been used for example. the eelpout sequencing and gene expression analysis.

Using EST data in biological applications, Noomi Asker.

Workshop at the Dept of Marine Ecology, University of Gothenburg, autumn 2009, including PhD-students, postdocs and senior scientists.

From unsequenced species to analyzed gene expression microarray. Noomi Asker and Erik Kristiansson. Short course at SETAC international meeting in Göteborg, May 2009. The course was attended by 10 international participants.

Large scale genomics techniques, analysis and modelling, Erik Kristiansson and Noomi Asker. Undergraduate course at the Dept of Math. Sciences, Chalmers School of Technology, Spring 2009

Ecotoxicology with emphasis on physiology, Noomi Asker. Undergraduate course at the Dept of Zoogogy, Gothenburg University.

Task 6.7 BALCOFISH website

Comment: The Balcofish websites (www.balcofish.science.gu.se/english) started in August, 2009. Webmaster is Noomi Asker.

Task 6.8 ICES guideline for eelpout monitoring within HELCOM COMBINE

Comment: Work in progress.

Task 6.9 Submission of relevant eelpout data to ICES's data base

Comment: Work in progress

2. Comparison with the original research and financial plan

The Balcofish project follows very well the original research and financial plan.

3. Statement if the research plan and schedule of deliverables had to be adapted

At current state of the project we have no reasons to believe that we have to do any changes.

4. Will results of third parties have influence on the working plan expected?

We do not currently expect influence of third parties.

5. Are there any changes in the future plan working plan expected?

Currently no changes in the future plans are expected

6. Are there any changes expected for the deliverables?

No changes of deliverables are currently expected