

Comparative transcriptomics in *Gadus morhua* and *Boreogadus saida* under different temperatures and PCO_2 levels



Biosciences - Integrative Ecophysiology

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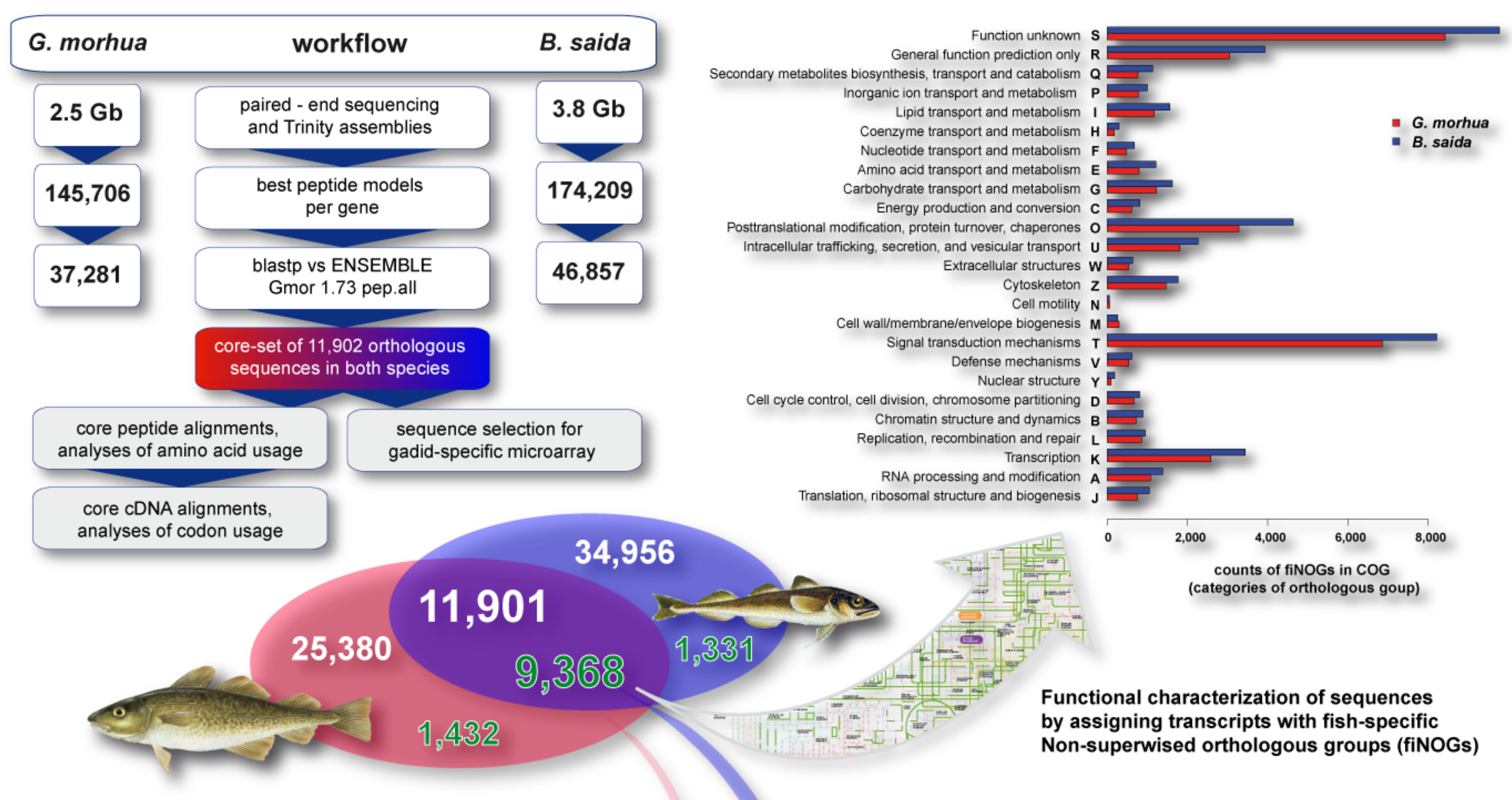


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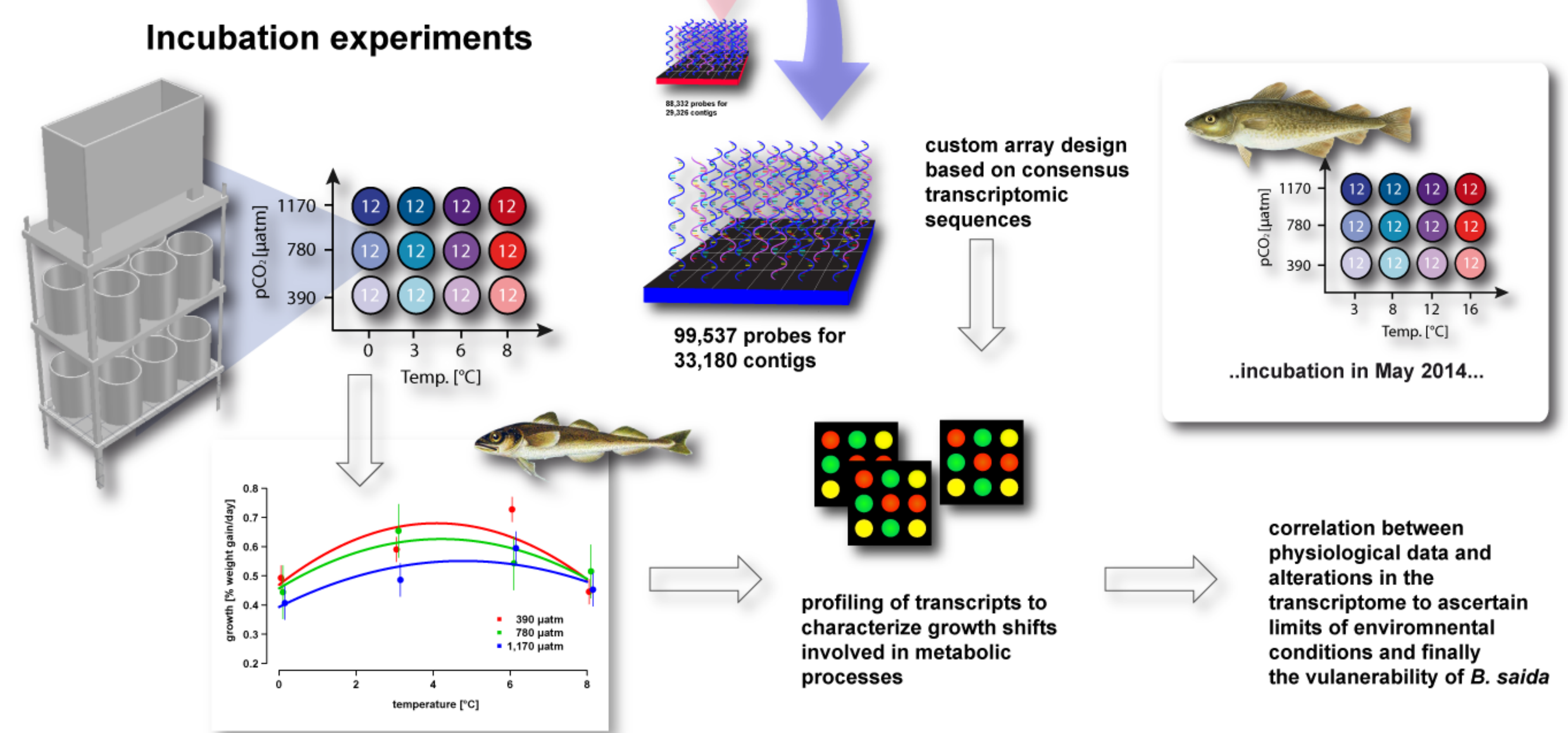
- Objectives**
1. Investigation of molecular genetic signatures of adaptation in *Boreogadus saida* and *Gadus morhua* to qualify their different capacities for acclimation determined by different evolutionary backgrounds.
 2. Characterization of gene expression profiles in relation to physiological performance parameters under combined PCO_2 and temperature treatments to evaluate species' fitness under future climate change projections.
 3. Characterization of population structures and dynamics in *Boreogadus saida* and *Gadus morhua* over time and possibly in relation to transcriptomic data, to project future distribution patterns and species interaction.

Sequence comparisons

DNA/RNA sequences as well as their respective translations of both cod species are being compared through analyses of normalized transcriptomic cDNA libraries. Orthologous sequences are used for codon and amino acid usage profiles as well as for the construction of a gadid-specific array. Moreover, as both libraries were built from 6 specimen (3 male + 3 female) we are able to localize SNPs in the transcriptome. A set of these polymorphisms will be used for population genetic studies.



Transcriptomic profiling The effects of combined temperature and CO_2 treatments will be assessed after long-term incubation in several tissues of *B. saida* and *G. morhua* at the transcriptomic level. Together with physiological performance parameters we will be able to characterize species' fitness as well as their vulnerability. To this end, a gadid-specific microarray is under construction to track changes of biological processes, cellular components and molecular functions under different conditions.



Population genetics

The composition of different cod populations will be analyzed through microsatellite and SNP analyses giving information about dynamics of stock development over time. For *G. morhua* data from beginning 1990ies are available, for *B. saida* data over longer time scales are scarce. Recent catches from 2012-2013 are depicted in the two maps.

