

Genetic conservation aspects of fish barcoding

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Animal Breeding & Genomics Centre



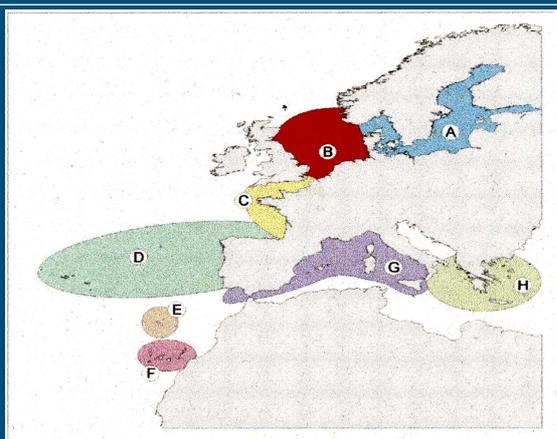
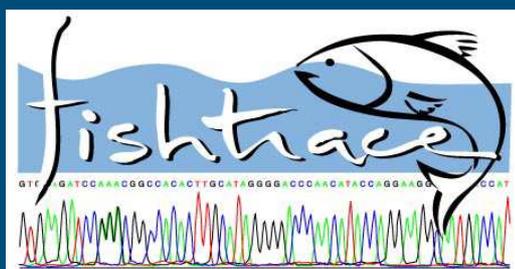
DNA bar-coding is a technique that uses gene sequences from a genome as a diagnostic

"biomarker" for species

- Barcode
- Identify species
 - Discover possible new species
 - Supports taxonomy research

European project 2003-2006

Marine teleost fish species



A. Skagerrak and Baltic sea. B. North Sea. C. English channel and Bay of Biscay. D. Cantabric Sea, Iberian Peninsula. E. Maderian Arquipalago F. Canary Islands. G. Western Mediterranean and Bay of Cadiz. H. Eastern Mediterranean Seas

Objectives

- Biological reference collections
- A taxonomic and molecular genetic catalogue
- On line web-based database of European marine fishes

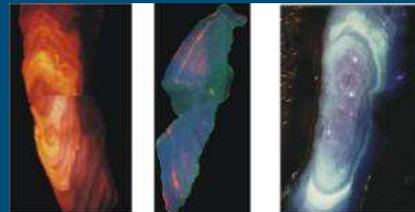
Setup of biological reference collections in National History Museums in Europe

- 250 marine fish species
- Otoliths
- Tissue samples
- DNA samples

Collection and Storage



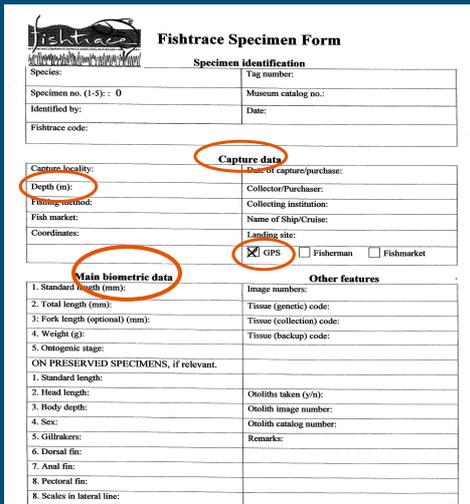




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Taxonomical and molecular genetic data



Fishtrace Specimen Form

Specimen Identification

Species: _____ Tag number: _____

Specimen no. (1-5): - 0 _____ Museum catalog no.: _____

Identified by: _____ Date: _____

Fishtrace code: _____

Capture data

Capture locality: _____

Depth (m): _____

Fishing method: _____

Fish market: _____

Coordinates: _____

Labour/capture/purchase: _____

Collector/Purchaser: _____

Collecting institution: _____

Name of Ship/Cruise: _____

Landing site: _____

GPS Fisherman Fishmarket

Main biometric data

1. Standard length (mm): _____

2. Total length (mm): _____

3. Fork length (optional) (mm): _____

4. Weight (g): _____

5. Ontogenetic stage: _____

Other features

Image numbers: _____

Tissue (genetic) code: _____

Tissue (collection) code: _____

Tissue (backup) code: _____

ON PRESERVED SPECIMENS, if relevant.

1. Standard length: _____

2. Head length: _____

3. Body depth: _____

4. Sex: _____

5. Gillrakers: _____

6. Dorsal fin: _____

7. Anal fin: _____

8. Pectoral fin: _____

8. Scales in lateral line: _____

Otoliths taken (y/n): _____

Otolith image number: _____

Otolith catalog number: _____

Remarks: _____





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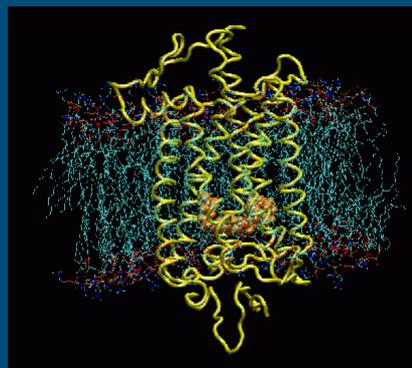
Molecular genetic data

Nucleotide sequences of two genes

- Rhodopsin
- Cytochrome b

Rhodopsin

- Genomic DNA
- Rhodopsin, vision pigment in the retina of fishes. Variation is significantly related to adaptive changes in the environment and habitats of species.



Results from the sequence data

- All 250 species collected can be identified based either on rhodopsin or cytochrome b sequences.
- Homology >99% within species.
- Variations are detected in the cytochrome b sequences from the same species in different geographical areas, for example sole
- For two species we found around 87% homology in the cytochrome b sequences between specimens collected in the northern part of Europe and the southern part.

Online database

Web-based database accessible at different levels

- constructors
- scientists entering data
- public

Future

- Maintain and extent database in collaboration with EU
- Development of new markers
- Identify and quantify ichthyo plankton

- Relation with bar-coding of Life project. Initiative Canada, Australia and USA. For fish seq cytochrome oxidase I.