



atlas

UNDERSTANDING DEEP ATLANTIC ECOSYSTEMS



Environmental DNA Quantitative PCR Assays for Marine Species Detection

Presenter: Jeanette EL Carlsson

ATLAS 3rd General Assembly
Hotel Blau Colonia Sant Jordi
Mallorca, Spain
9 – 12 April 2018



AREA 52

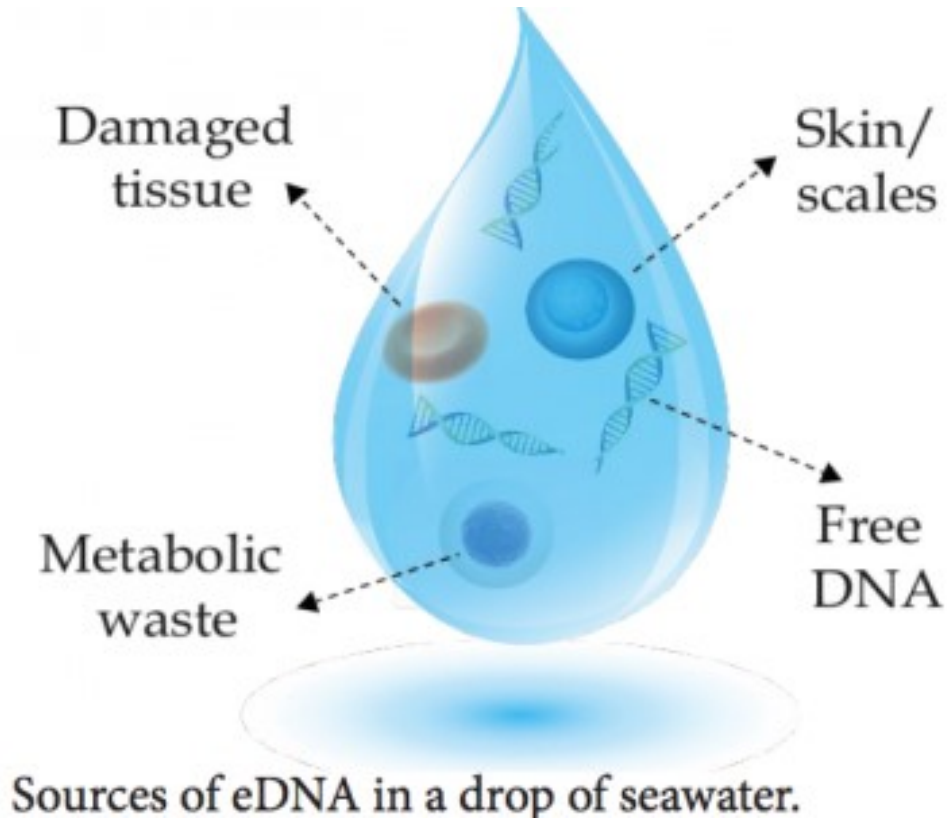


Task

Develop species specific environmental (e)DNA qPCR assays for marine species



What is eDNA?





Why eDNA?

-non invasive





Why eDNA?

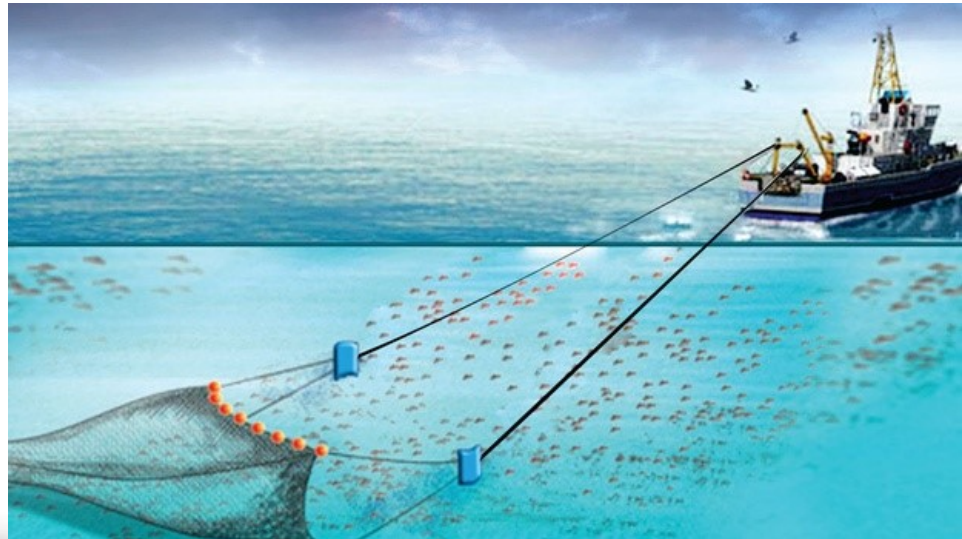
- non invasive
- cost effective





Why eDNA?

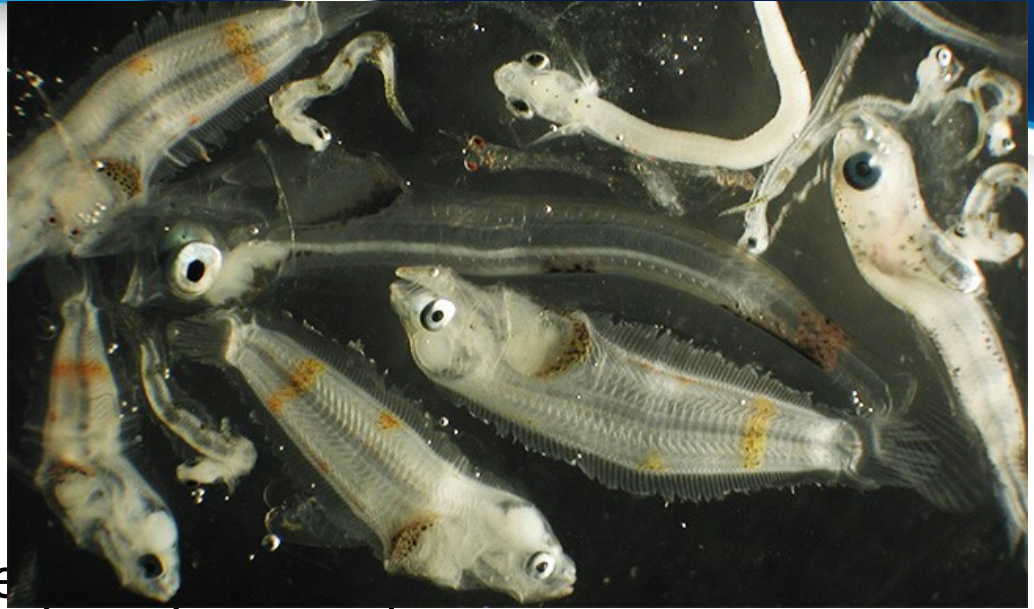
- non invasive
- cost effective
- samples are relatively easy to sample

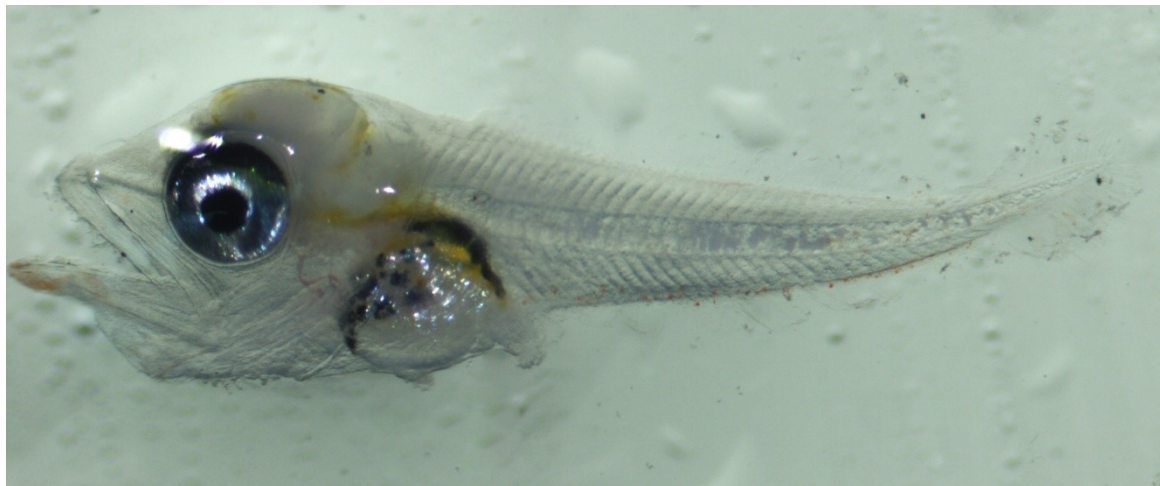




Why eDNA?

- non invasive
- cost effective
- samples are relative
- does not rely on taxonomic expertise





-can be used on any life stage





atlas



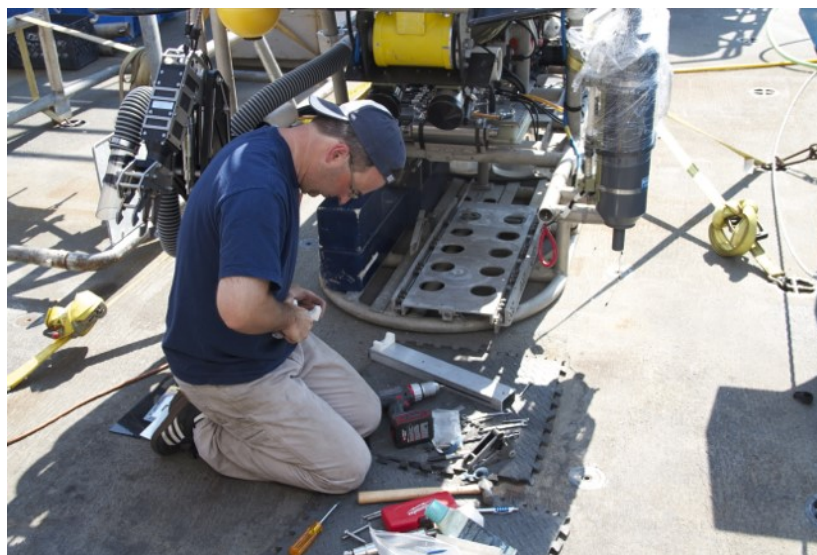
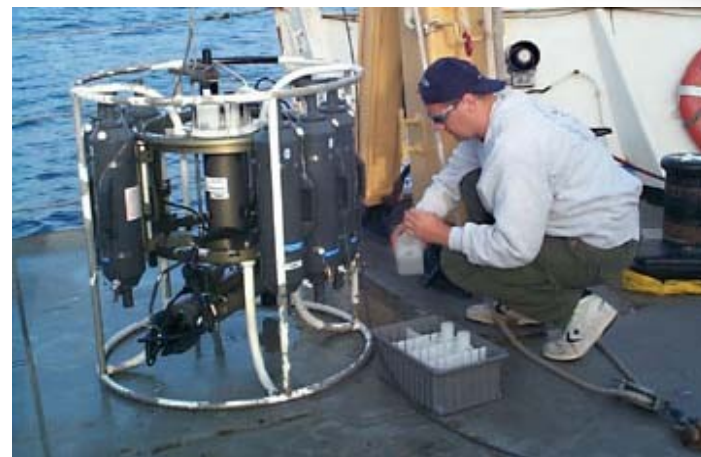
o sam
exper

- can be used on any life stage
- Easy to take replicates/coverage

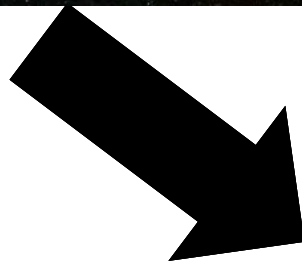
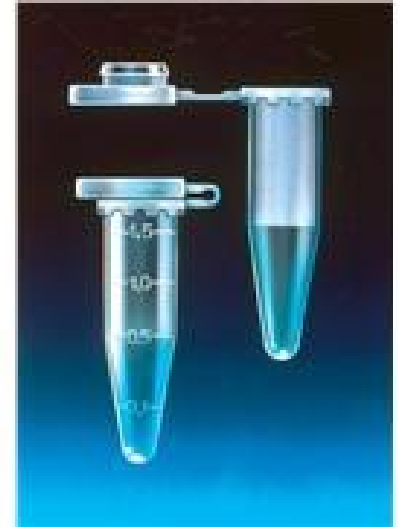
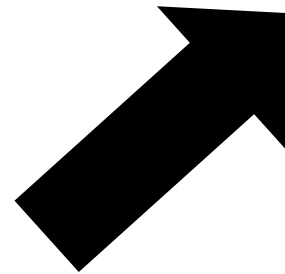




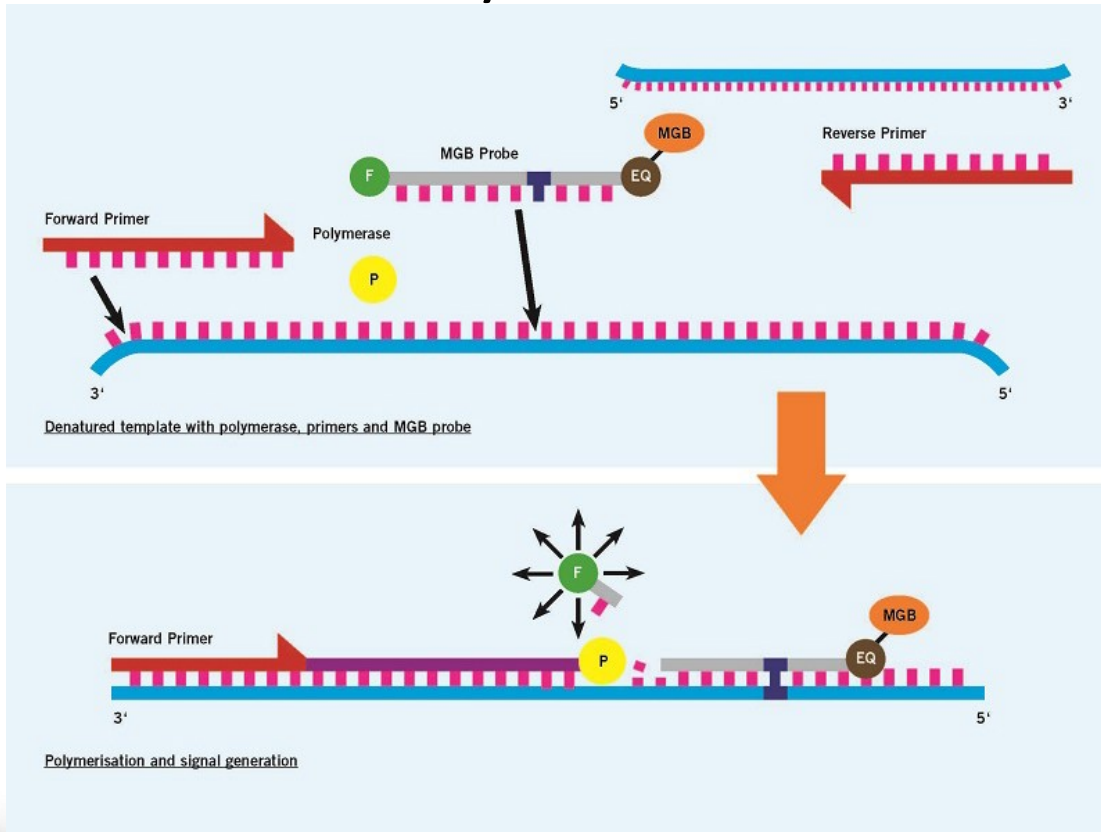
How do you sample it?



How do you sample it?



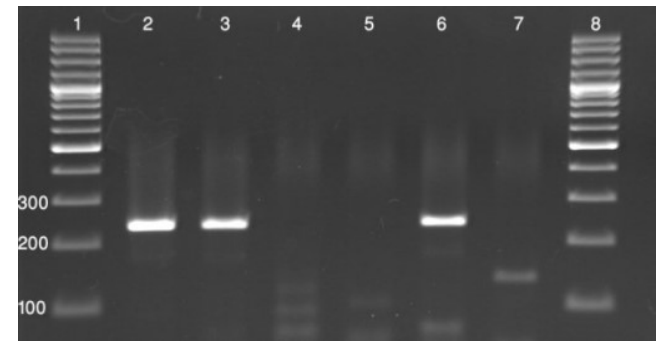
How do you detect it?



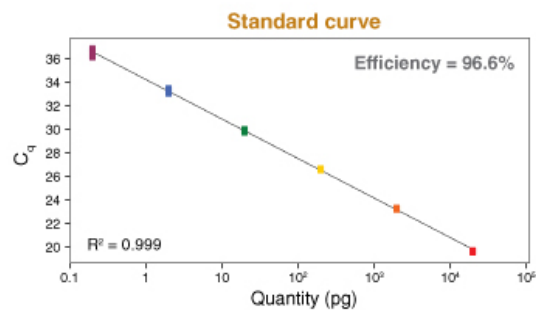
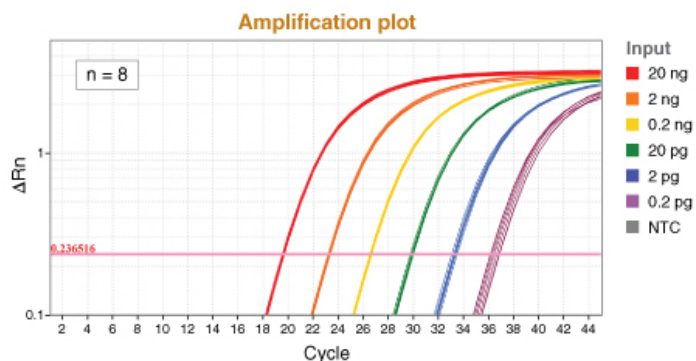
MGB TaqMan assay

- mtDNA (COI, 16S, CytB etc)
- species specific

1. Design assay
2. Order primers
3. Test multiple species



How do you detect it?



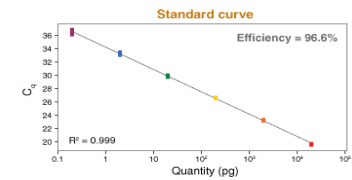
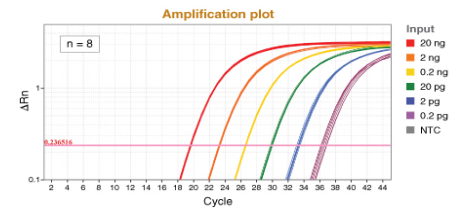
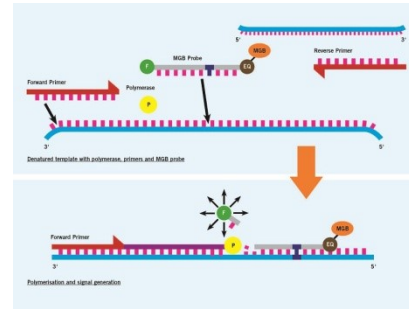
qPCR

qPCR

4. Test for specificity
5. Field validation



eDNA MGB probe assay





MGB TaqMan assay and field validation completed

Chilean devil ray






Mar Biol (2017) 164:112
DOI 10.1007/s00227-017-3141-x

Validation

METHOD

Development of a sensitive detection method to survey pelagic biodiversity using eDNA and quantitative PCR: a case study of devil ray at seamounts

Laura M. Gargan^{1,2}  · Telmo Morato³ · Christopher K. Pham³ · John A. Finarelli² · Jeanette E. L. Carlsson^{1,2} · Jens Carlsson^{1,2}

Received: 20 January 2017 / Accepted: 5 April 2017
© Springer-Verlag Berlin Heidelberg 2017



MGB TaqMan assays completed and
undergoing field validation

Orange roughy



MGB TaqMan assays completed and undergoing field validation

Orange roughy
Mirocaris fortunata





MGB TaqMan assays completed and undergoing field validation

Orange roughy

Mirocaris fortunata

Blackbelly rosefish





MGB TaqMan assays undergoing assay development

Lophelia pertusa - received unpublished sequences from Sophie Arnaud Haond that will resolve issues with species specificity

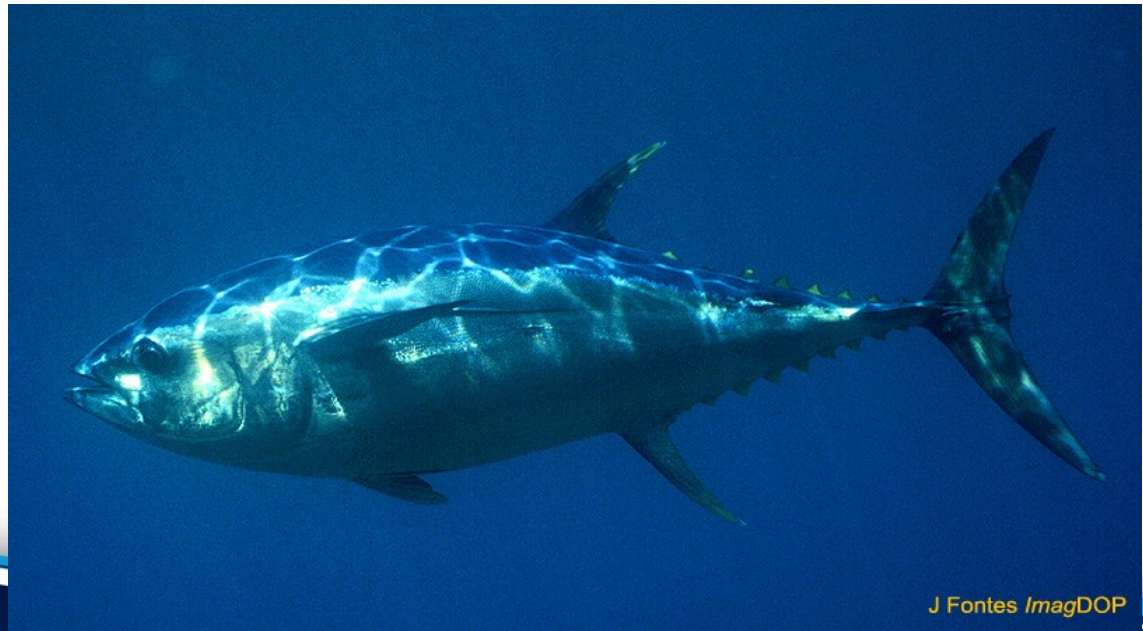




MGB TaqMan assays undergoing assay development

Lophelia pertusa - received unpublished sequences from Sophie Arnaud Haond that will resolve issues with species specificity

Bigeye tuna - problematic due to lack of species specific COI regions. Further mtDNA regions are being investigated



Thank You!



Presenter details:

*Jeanette EL Carlsson, Telmo Morato
& Jens Carlsson*

Project Contact Details:

Coordination: Professor Murray Roberts
murray.roberts@ed.ac.uk

Project Management: Dr. Laurence De Clippele
EU-Atlas@ed.ac.uk

Communication & Press: Dr. Annette Wilson
annette@aquatt.ie

Follow us:  [@eu_atlas](https://twitter.com/eu_atlas)
 [@EuATLAS](https://facebook.com/EuATLAS)

