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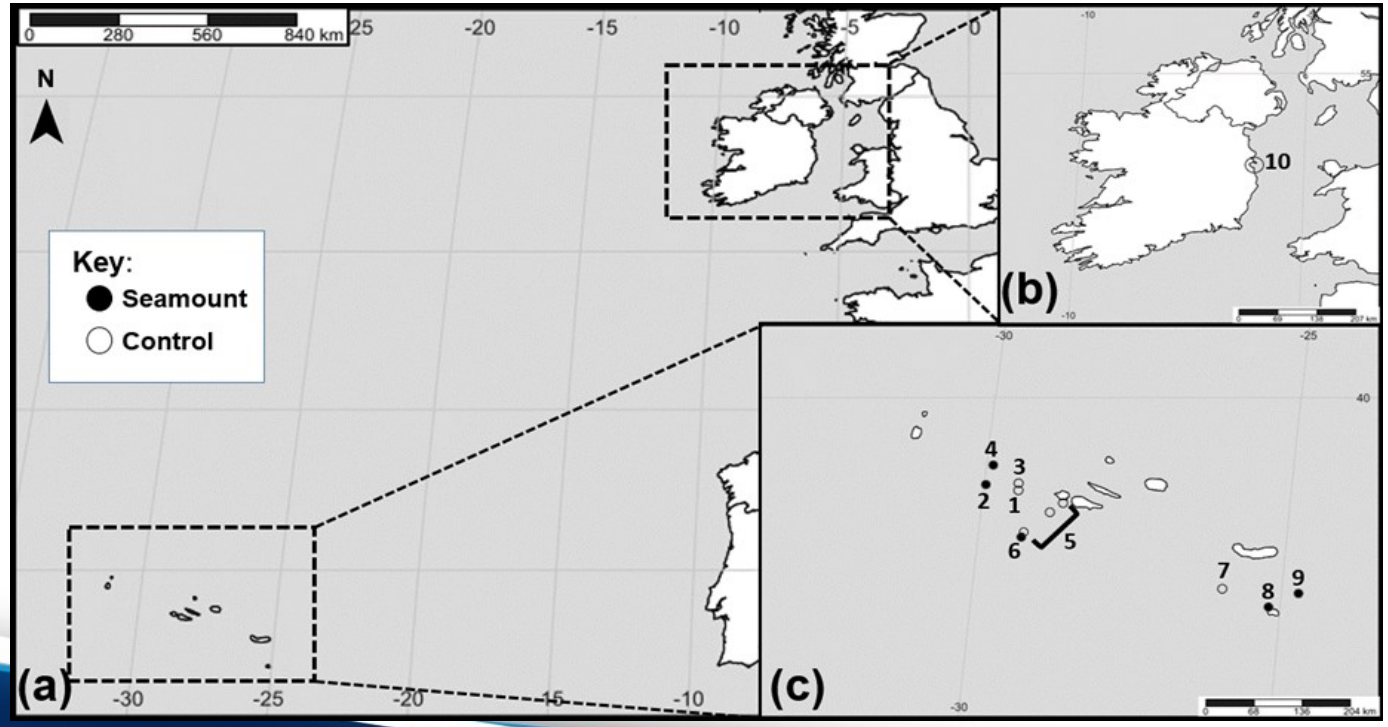
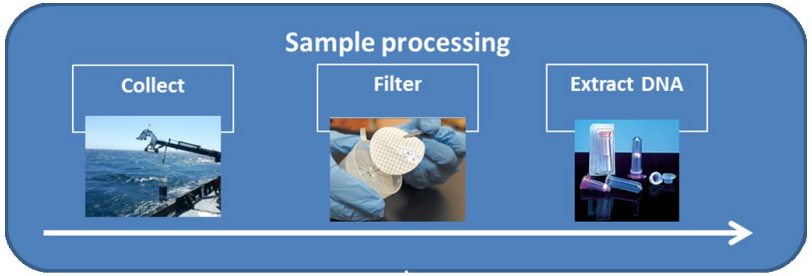
Jeanette Carlsson

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





28 Azores water samples
PLUS control from Dublin Bay

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Developm… biodiversi… ray at sea… …rvey pelagic …il

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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 Morato[3] · Christopher K. Pham[3] · John A. Finarelli[2] · Jeanette E. L. Carlsson[1,2] · Jens Carlsson[1,2]

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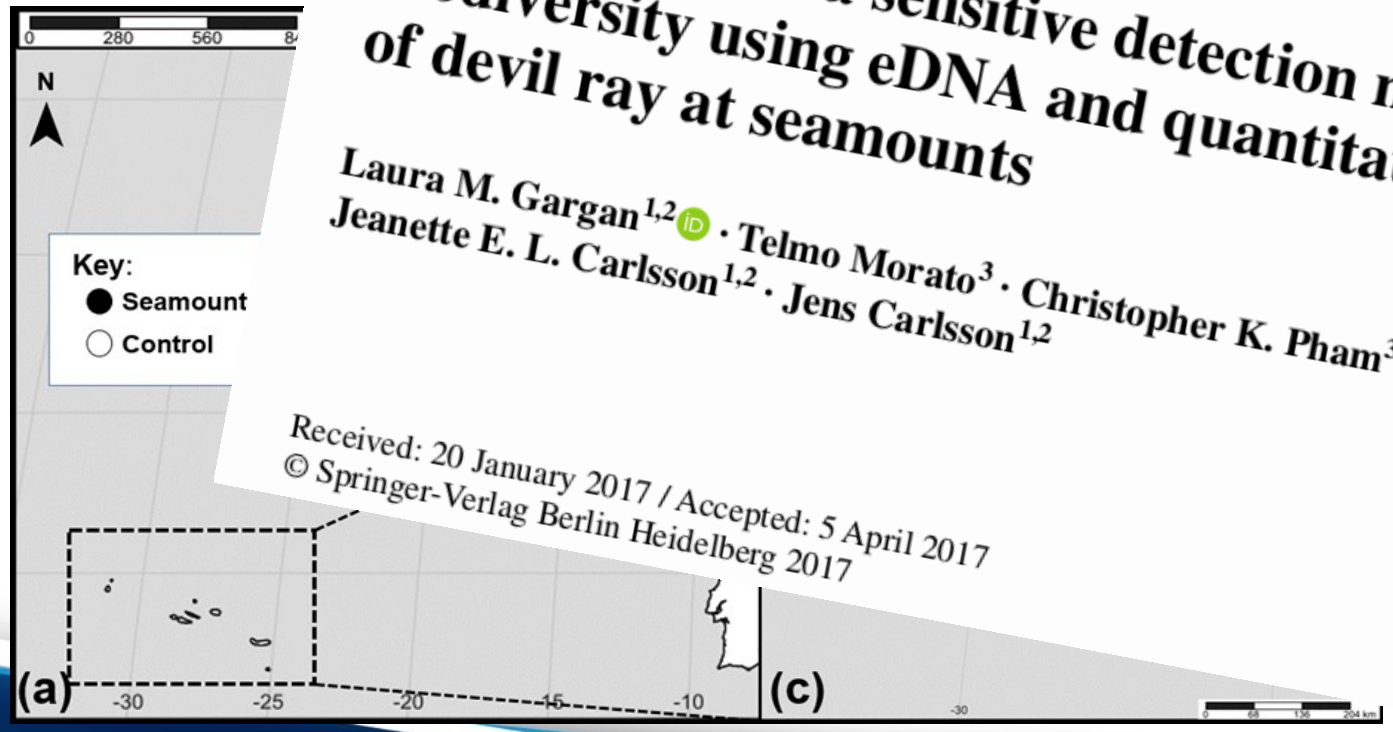

CrossMark

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Methods: Target species and primer design

Pilot study using the Chilean devil ray (*Mobula tarapacana*) - large, pelagic ray

Vulnerable (IUCN Red List)

Limited data on its distribution/ecology

Difficult to sample and observe – but aggregations occur in the Azores seasonally

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Mtar-F           1 AACCACCTGCAATCTCTCAATATCA-------------------------------------------------------------------------- 86
Mtar-R           1 ----------------------------------------------------------CAACTGTCCTTCTATTATTATCTCTTCCC 86
Mtar-PR          1 --------------------------------CTTGTTTGTTTGATCAATTC---------------------------------------------- 86
M.tarapacana     1 AACCACCTGCAATCTCTCAATATCAAACGCCCTTGTTTGTTTGATCAATTCTAATCACAACTGTCCTTCTATTATTATCTCTTCCC 86
M.japanica       1 AACCACCTGCAATCTCTCAATATCAAACACCATTATTTGTCTGATCTATCCTAATTACAACTGTCCTTCTCTWATTATCCCTCCCA 86
M.mobular        1 AACCACCTGCAATCTCTCAATATCAAACACCATTATTTGTCTGATCTATCCTAATTACAACTGTCCTTCTCTTATTATCCCTCCCA 86
M.birostris      1 AACCACCTGCAATCTCTCAGTATCAAACACCCTTATTCGTTTGATCAATTCTAATCACAACTGTCCTTCTCTTATTATCCCTCCCC 86
R.undulata       1 AACCACCAGCAATCTCTCAATACCAAACACCCCTATTCGTCTGATCAATCCTTGTTACAACTGTCTTACTTCTTATGGCCCTTCCA 86
D.pastinaca      1 AACCCCCYRCAATYTCCCAATATCARACACCTCTMTTCGTYTGATCTATTCTCATTACAACAGTYCTCCTTTTAYTATCACTCCCA 86
```

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Results: Comparison of visual and genetic detection

Location	Latitude/longitude	Collection start date	No. samples	Visual observation	Genetic detection	Location reference
Ambrósio seamount - before *M. tarapacana* aggregation[1]	37.052300; -25.189000	24/08/2014	2	-	-	8
Ambrósio seamount - after *M. tarapacana* aggregation[2]	37.052300; -25.189000	27/08/2014	2	+	-	8
Dollabarat seamount	37.237416; -24.725266	25/08/2014	2	+	+	9
Ambrósio and Dollabarat - far field control	37.300666; -25.962000	30/08/2014	2	-	-	7
Gigante seamount	38.989100; -29.890816	26/09/2014	3	-	-	4
Gigante seamount - far field control	38.740166; -29.444150	26/09/2014	1	-	-	3
Seamount "127"	38.722233; -29.972833	25/09/2014	3	-	-	2
Seamount "127" - far field control	38.641950; -29.433866	25/09/2014	1	-	-	1
Princesa Alice seamount	38.004933; -29.298750	27/08/2014	2	+	+	6
Princesa Alice seamount	37.999100; -29.300566	19/09/2014	2	+	+	6
Princesa Alice seamount	38.004933; -29.298750	26/09/2014	2	+	+	6
Princesa Alice seamount - far field control	38.013383; -29.307083	27/08/2014	2	-	+	5
Princesa Alice seamount - far field control	38.342783; -28.881483	19/09/2014	2	-	-	5
Princesa Alice seamount - far field control	38.468366; -28.684316	26/09/2014	2	-	-	5
Dublin Bay	53.297652; -6.147623	08/11/2015	3	-	-	10

G test for independence: G = 9.289, p = 0.002

4/5 positive visual detections were detected genetically

9/10 negative visual detections were not detected genetically

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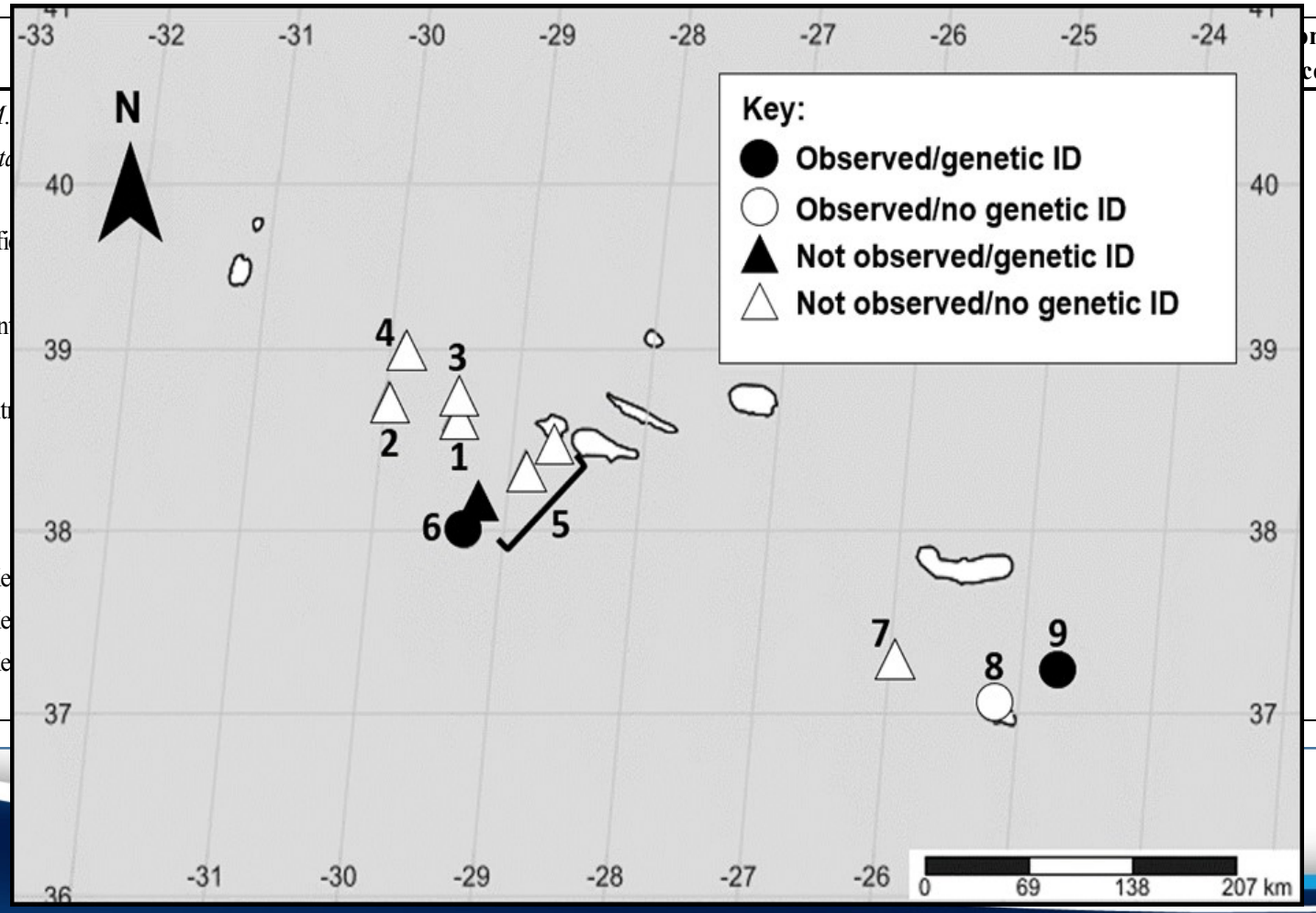
Results: Comparison of visual and genetic detection

Location
Ambrósio seamount - before *M.*
Ambrósio seamount - after *M. t*
Dollabarat seamount
Ambrósio and Dollabarat - far fi
Gigante seamount
Gigante seamount - far field con
Seamount "127"
Seamount "127" - far field cont
Princesa Alice seamount
Princesa Alice seamount
Princesa Alice seamount
Princesa Alice seamount - far fie
Princesa Alice seamount - far fie
Princesa Alice seamount - far fie
Dublin Bay



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Further ATLAS species

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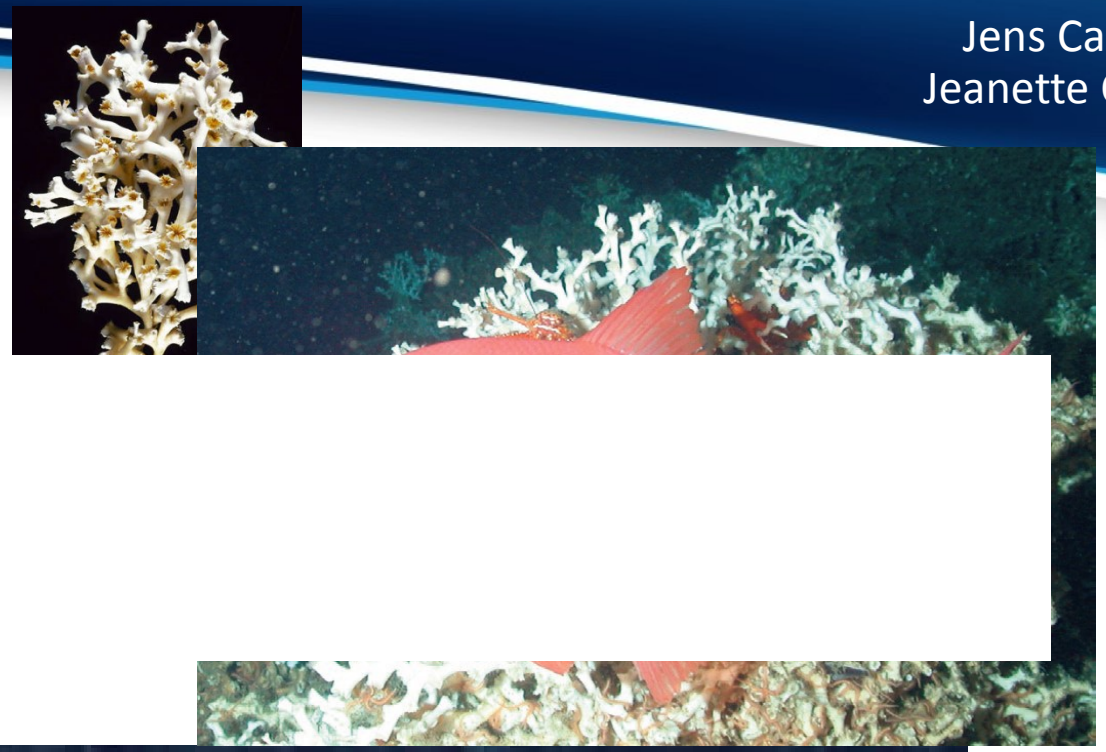
Further ATLAS species



Hoplostethus atlanticus or *Beryx decadactylus*

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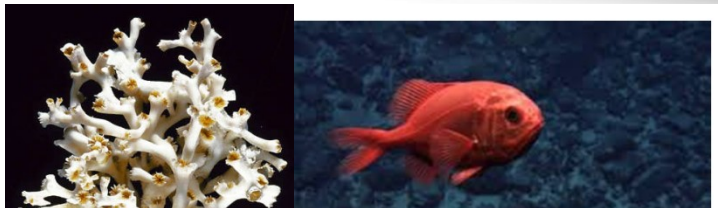

Further ATLAS species

Hoplostethus atlanticus or *Beryx decadactylus*

Helicolenus dactylopterus

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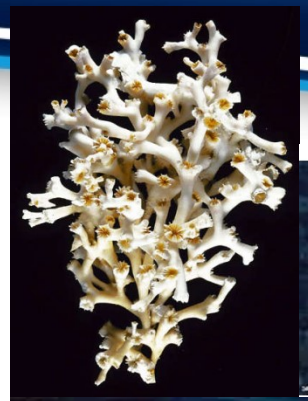

Further ATLAS species

Hoplostethus atlanticus or *Beryx decadactylus*

Helicolenus dactylopterus

Thunnus obesus

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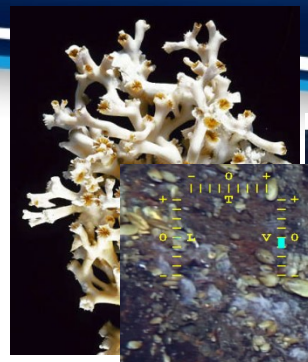
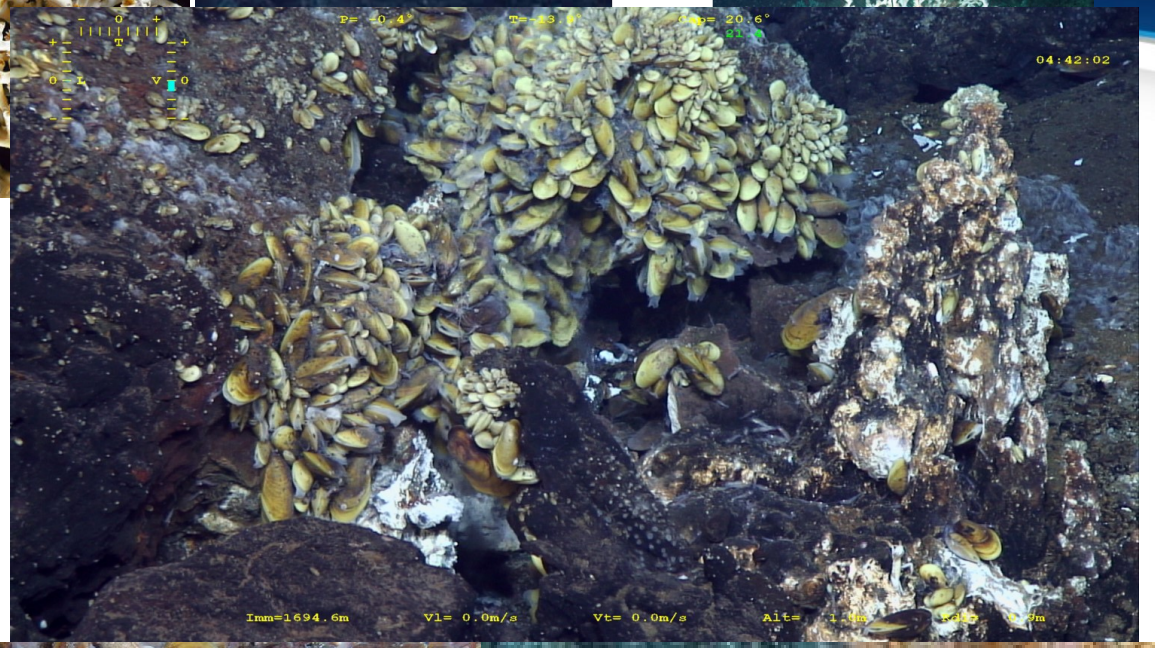
Further ATLAS species





Hoplostethus atlanticus or *Beryx decadactylus*

Helicolenus dactylopterus

Thunnus obesus

Bathymodiolus azoricus, or Mirocaris fortunata or Segonzacia mesatlantica

Thank You!

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