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Otolith geochemical signatures as a new tool to identify *Aphanopus carbo* and *Aphanopus intermedius* in otolith historical collections

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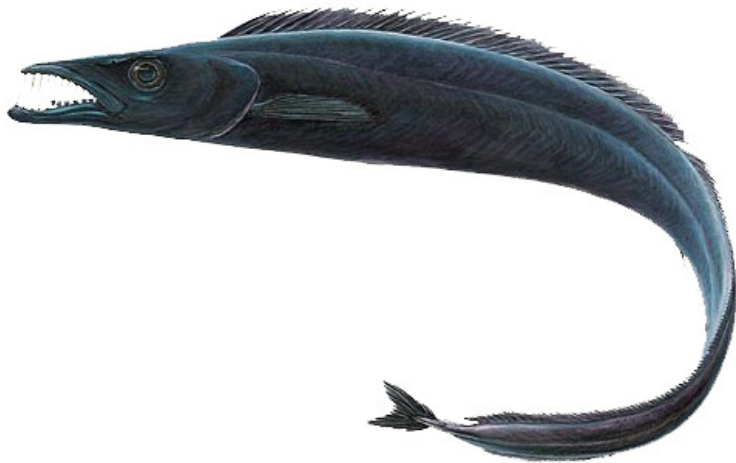
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WHAT DO WE KNOW?

New species of *Aphanopus* identified around the Madeira Archipelago.

A. intermedius is mixed with *A. carbo*.

Indistinguishable by direct observation.

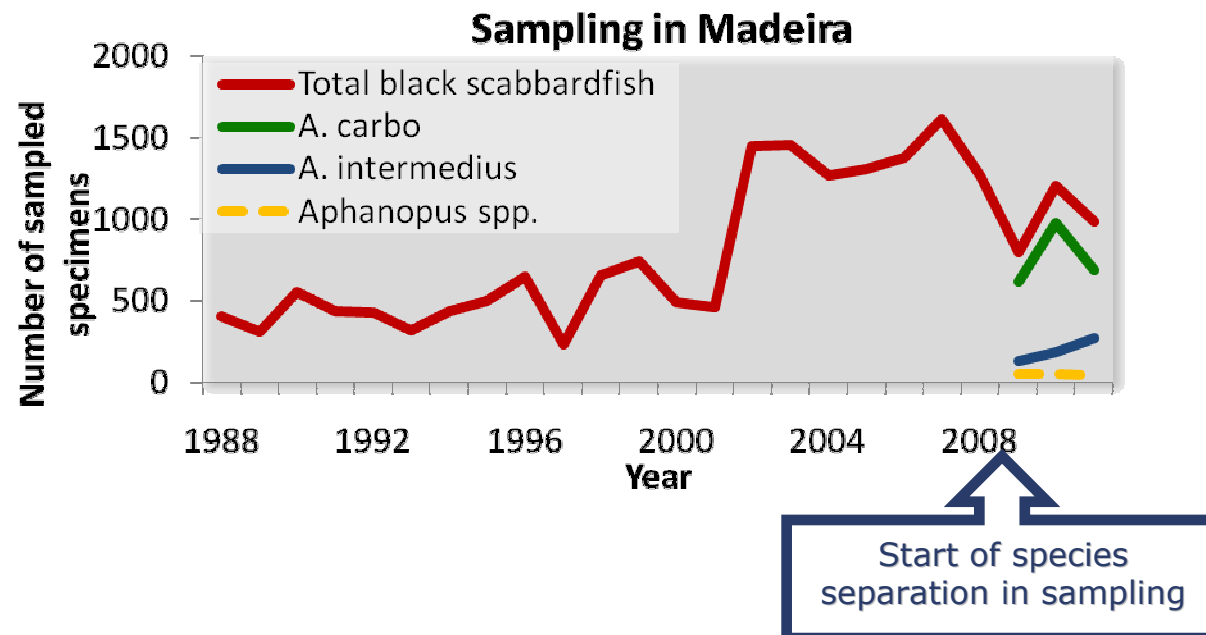
Both species have been successfully separated by:
genetics;
meristics.

There is no complete record of meristic characters nor genetic information for historical data.

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WHAT IS THE PROBLEM?

Both species are found mixed in commercial landings in Madeira where they are the most important marine resource.



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What is the proportion of *Aphanopus* species in Madeira landings?

We propose a new tool to separate species which is of major importance for understanding their exploitation pattern based on **otolith geochemical signatures**

Premises:

1. Otoliths are metabolically inert → each layer is a record of environmental conditions
2. Otoliths can incorporate seawater trace metals in their calcium carbonate matrix
3. Otolith chemical composition is species specific

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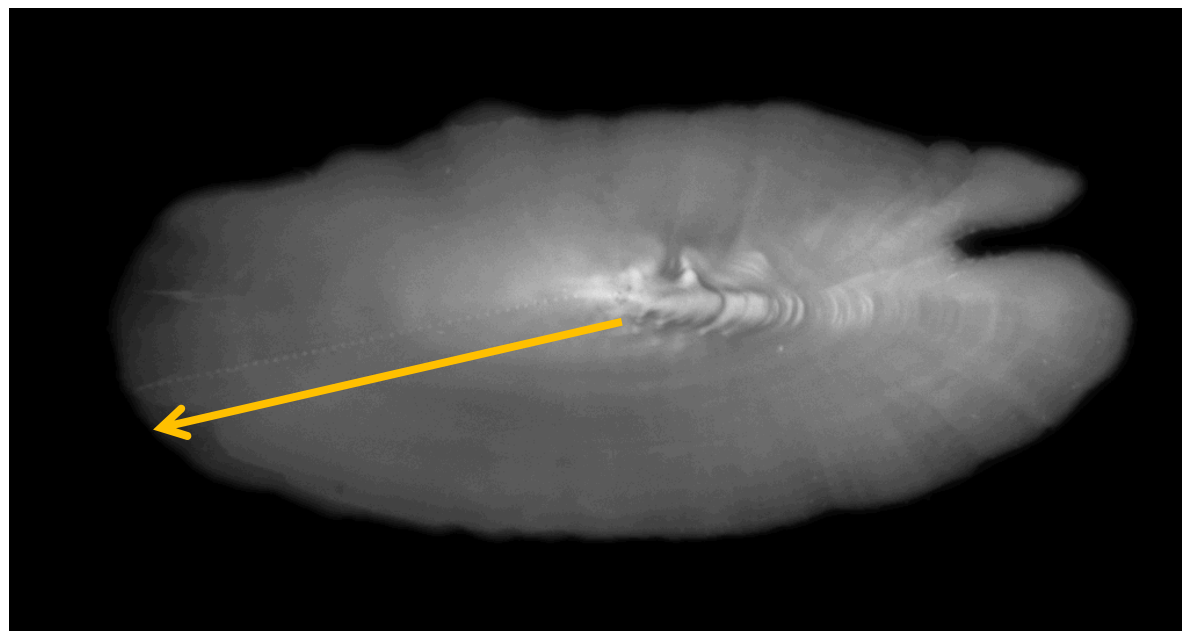
METHODOLOGY

Species assignment followed Biscoito *et al.* (2011).

Distal face of right *sagitta* otoliths was polished.

NewWave UP-213nm Nd:YAG Laser Ablation System coupled to a Thermo Finnigan Element2 ICPMS (LA-ICPMS)

Transect of individual spots along posterior growth axis.

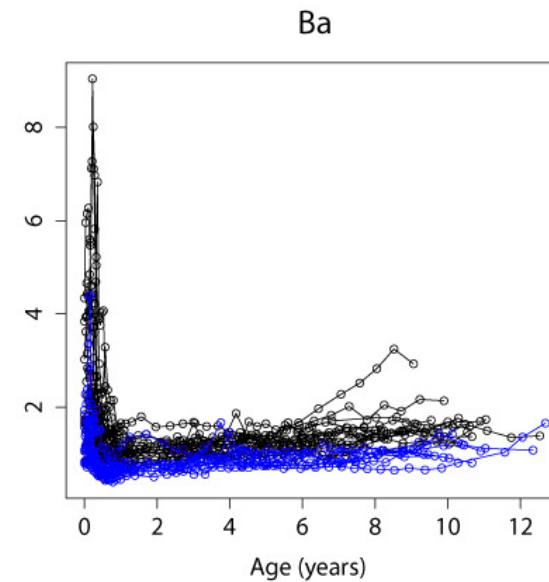
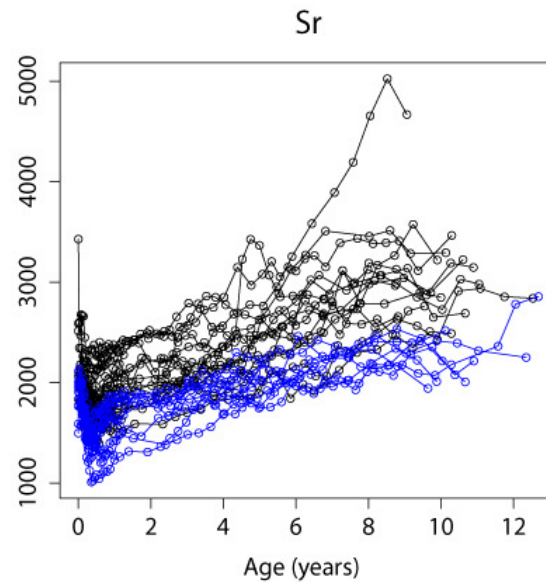


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PRELIMINARY RESULTS

	Li7	Mg24	Ca44	Cr52	Zn66	Rb85	Sr88	Cd112	Ba138	Pb208
<i>A. carbo</i>	0.53	16.97	3.89x10 ⁵	5.08	0.13	0.02	2.23x10 ³	2.62x10 ⁻³	1.58	0.01
	±	±	±	±	±	±	±	±	±	±
<i>A. intermedius</i>	0.55	12.91	5.99x10 ³	1.36	0.1	0.01	5.31x10 ²	9.30x10 ⁻⁴	1.04	0.01
	±	±	±	±	±	±	±	±	±	±
	0.36	11.4	3.87x10 ⁵	4.34	0.1	0.02	1.81x10 ³	2.30x10 ⁻³	0.93	4.75x10 ⁻³
	±	±	±	±	±	±	±	±	±	±
	0.24	2.89	6.07x10 ³	0.63	0.14	0.01	3.27x10 ²	4.53x10 ⁻⁴	0.44	0.01
							sign. diff.		sign. diff.	

average ± s.d. (μg.g⁻¹)



In table, elements highlighted in blue are statistically different between species.

In plots, *A. carbo* is represented in black and *A. intermedius* in blue.