Influence of environmental conditions on Antarctic Notothenioi trophic ecology in a context of climate change

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Introduction & methods

- Southern Ocean (SO) undergoes major environmental modifications (changes in sea ice cover, temperature, pH, ...).
- Icefishes (Notothenioidae) living in the SO can exploit various ecological niches and are an important component of food webs.
- Lepidonotothen and Trematomus are two widespread genera in SO.

How will these two widespread genera of icefishes react to environmental changes in SO? Will it influence their trophic ecology, and notably resources partitioning?

Results

1) Temporal variation of isotopic composition in 2002/2004 (A) and in 2015/2016 (B)

- Large variability in isotopic composition among these 6 species:

<table>
<thead>
<tr>
<th>Species</th>
<th>δ13C (%)</th>
<th>δ15N (%)</th>
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<tbody>
<tr>
<td>Lepidonotothen squamifrons</td>
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<td></td>
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<tr>
<td>Trematomus lepordinthus</td>
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2) Temporal evolution of isotopic niches

- Overlap of isotopic niches for the 2002/2004 campaigns: Lepidonotothen niche is entirely included in that of Trematomus.
- Niches are completely separated in 2015/2016.

3) Model-estimated Standard Ellipse Area (SEA)

According to Bayesian modelling of SEAc (proxy of the realized ecological niche width; 10⁴ posterior draws):

- Trematomus: SEA 2002/2004 > SEA 2015/2016 in 96.3% of model estimates.
- 2002-2004: SEA Trematomus > SEA Lepidonotothen in 99.9% of model estimates.
- 2015-2016: SEA Trematomus = SEA Lepidonotothen.

Discussion and perspectives

1. Broad distribution of these Antarctic Notothenioid species in the isotopic space: they exploit a wide array of resources, especially Trematomus species.
2. Species-dependant temporal evolution of the isotopic niches: taxon-specific ecological plasticity in response to environmental change and/or to prey availability in SO?
3. Decrease of the amounts of resources exploited by Trematomus species over time and of the overlap between niches of the two genera: evidence of past competition?
4. These results should be complemented with a stomach content analysis and to use mixing models (including isotopic composition of potential prey) to better identify possible changes in icefish trophic ecology.

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