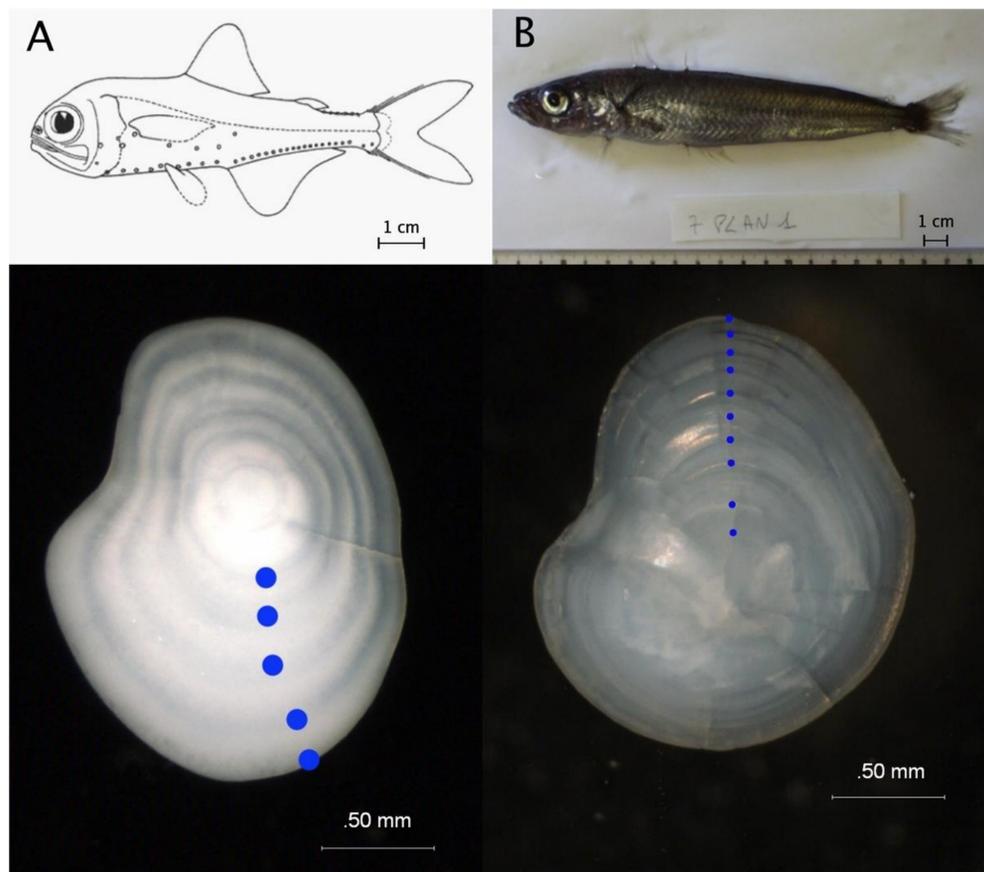


The Impact of Sea-Ice on the Recruitment of Antarctic Fish

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Introduction

- *Electrona antarctica* and *Pleuragramma antarcticum* are Antarctic teleost fish that prey on krill and are consumed by seabirds (La Mesa et al., 2004; Greely et al., 1999).
- Decades of sea-ice decline around the Antarctic Peninsula have significantly decreased krill populations (Smith and Stammerjohn, 2001; Loeb et al., 1997).
- Otoliths, calcium carbonate earbones in teleosts, form annual marks and can be used to estimate a fish's age (Pannella, 1971).
- **Hypothesis**
Sea-ice decline over 2004-2006 will affect the recruitment of these species.



An illustration of an *Electrona antarctica* (Photograph: Heemstra, P) and a five-year old surface-aged otolith (Photograph: Fang, S) (A). A *Pleuragramma antarcticum* (Photograph: Sala, A.), and a ten-year old thin-sectioned otolith (Photograph: Fang, S) (B).

Materials and Methods

- Otoliths were extracted from seabird guano (South polar and brown skuas breeding on the Antarctic Peninsula).
- *E. antarctica* and *P. antarcticum* otoliths were identified and cleaned.
- A 20% subsample for each year from 2004-2006 was aged.
 - *E. antarctica* were aged by surface reading annuli.
 - *P. antarcticum* were aged by counting annuli on a thin section.
- One-way analysis of variance tests determined if the average ages differed amongst the three years.



Using forceps, Sonia Fang extracts otoliths from diluted skua guano (Photograph: Karnovsky, N)

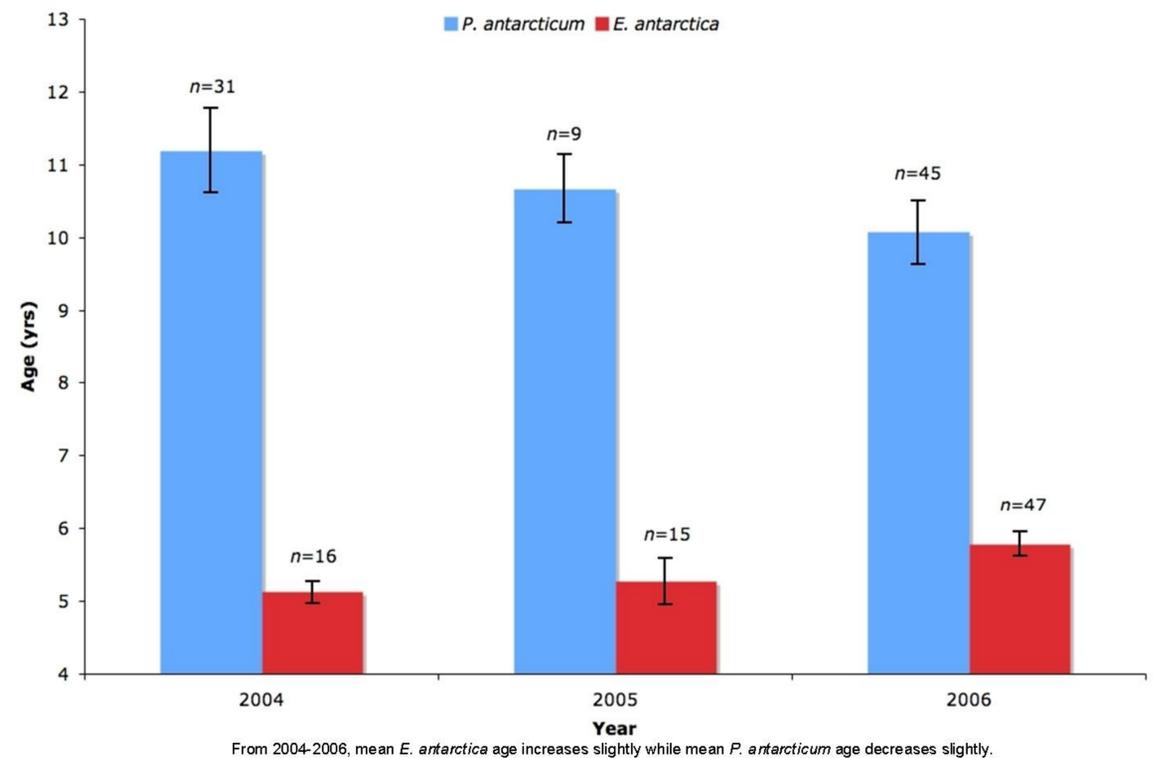
Results

E. antarctica

- Mean ages did not vary significantly between years (df=2, $P=0.060$), though there was a **trend of increasing mean age**.
- For the entire subsample, the minimum age was 4 years, the mean age was 5.6 yrs and the maximum age was 9 yrs.

P. antarcticum

- Mean ages did not vary significantly (df=2, $P=0.26$), though there was a **trend of decreasing mean age**.
- For the entire subsample, the minimum age was 6 yrs, the mean age was 10.5 yrs, and the maximum age was 19 yrs.



Discussion

- Decreasing age of *P. antarcticum* may reflect declines in adults, which live and feed under ice.
- Increasing age of *E. antarctica* may reflect decline in recruitment of new cohorts which may require ice during early stages.
- Seabirds can be an effective way to collect these fish which are inaccessible and expensive to catch with nets.

Acknowledgements

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