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Comparative assessment of life History Traits in small Pelagic Fish communities in High-Productivity Coastal Systems



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INTRO / BACKGROUND

- **Small pelagic fish** (SPF) communities play a crucial role in **marine food webs**, serving as a **central link** between primary producers and higher trophic levels².
- The abundance of SPF populations in high boundary productivity systems experiences **strong variations**, making their dynamics **difficult** to **predict**¹.
- Understanding the dynamics of SPF populations and their **responses** to **environmental factors** can aid in **sustainable resource exploitation**, ensuring the long-term viability of both the fish populations and the marine ecosystems they inhabit.

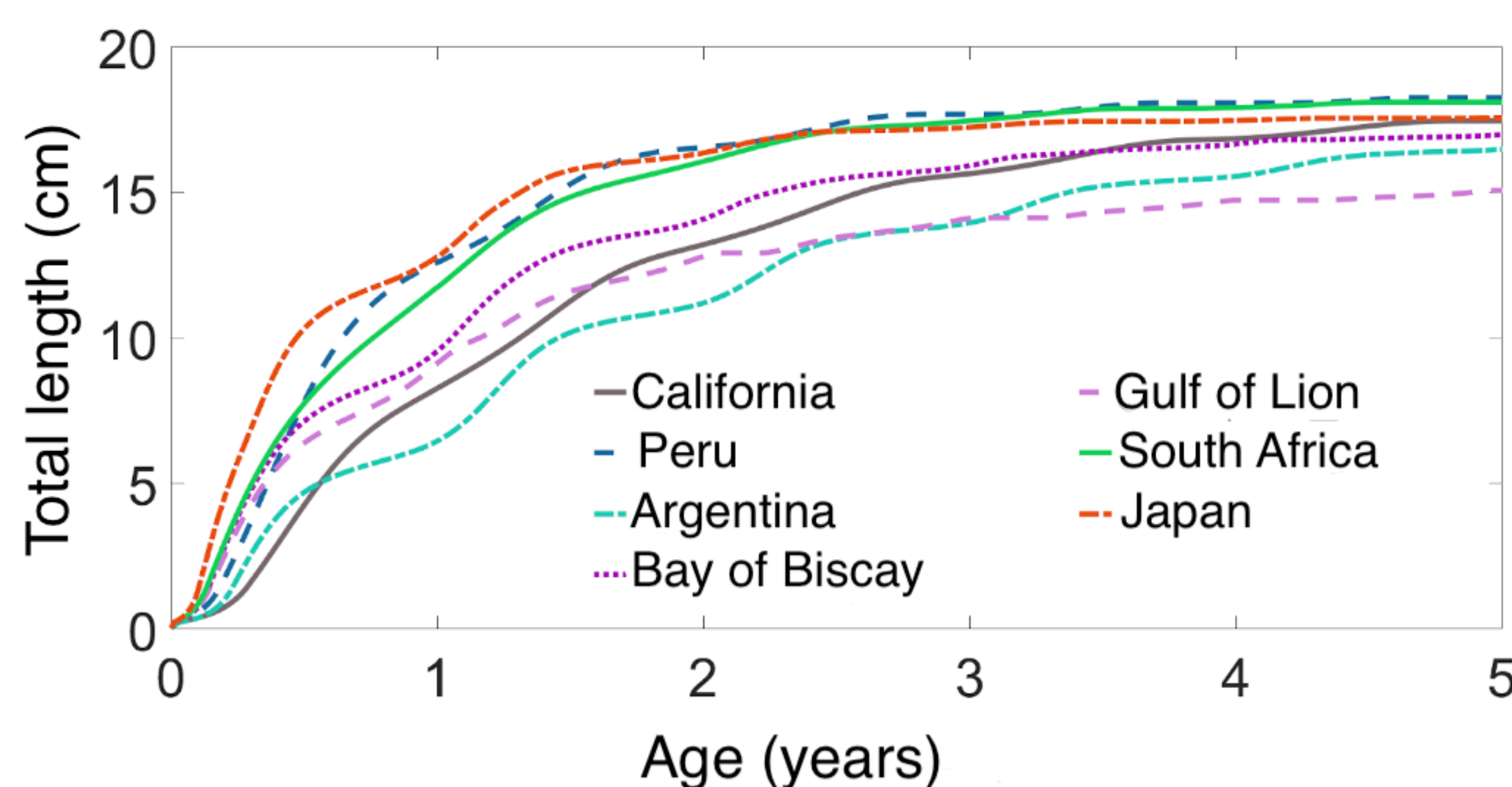
RESEARCH QUESTION

How can we explain the **variations** in **biological traits** (development, growth, reproduction) observed among **small pelagic species** (*Engraulis* spp., *Sardina pilchardus*, *Sardinops sagax*, *Sardinella* spp.) that are abundant in highly productive coastal ecosystems?

OBJECTIVES

- Enhance understanding of the **variability of individual SPF** responses to environmental factors
- Better understand the role of the **bottom-up forcing** and the impact of **bioenergetic characteristics** on these variations
- Provide insights into the **mechanisms** driving the **fluctuations** in SPF populations in high-productivity systems

FIRST RESULTS

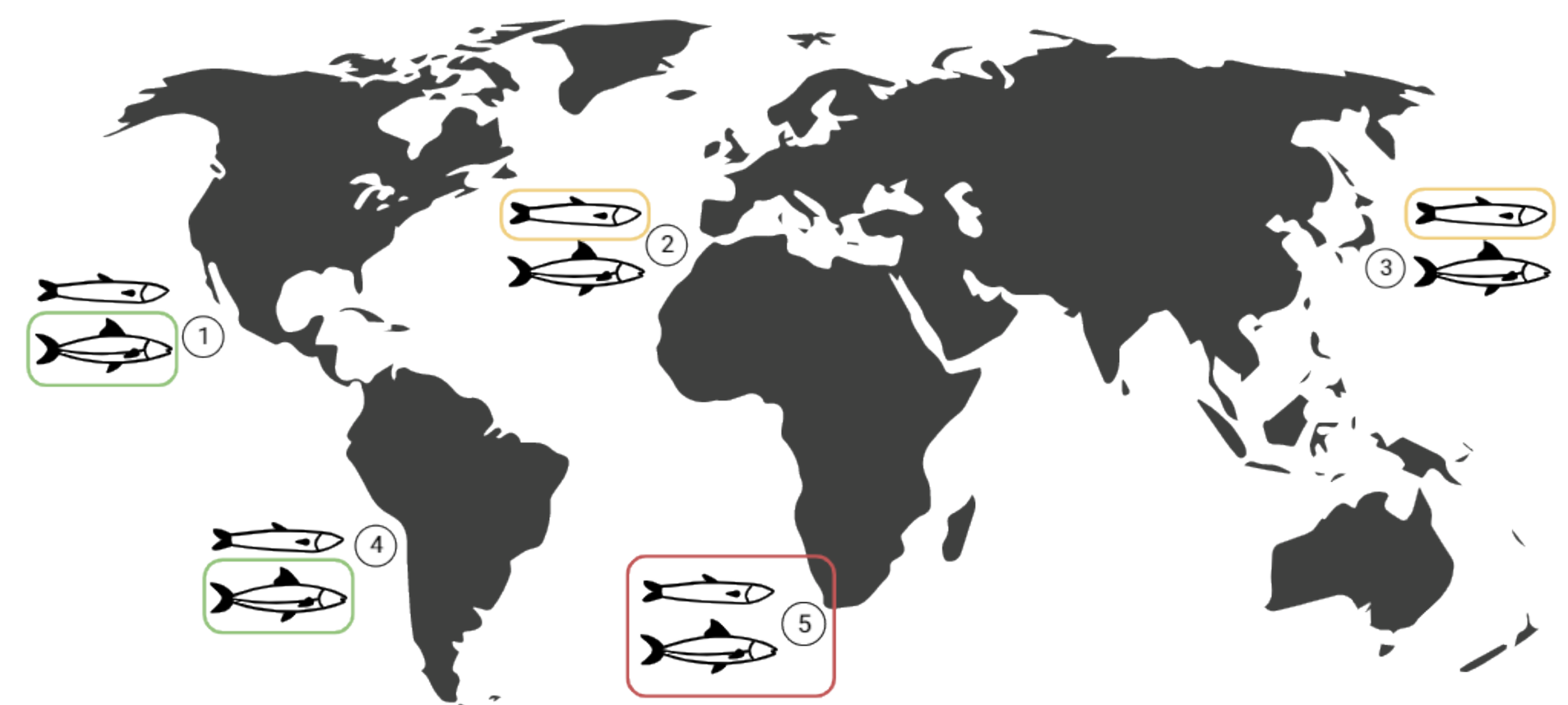


- 7 simulations = **7 major anchovy populations** of the genus *Engraulis* spp.
- 1 simulation = 1 average individual from a population with the **environmental conditions of its region**
- **Identical physiology**: same set of parameters for all populations

CONCLUSION

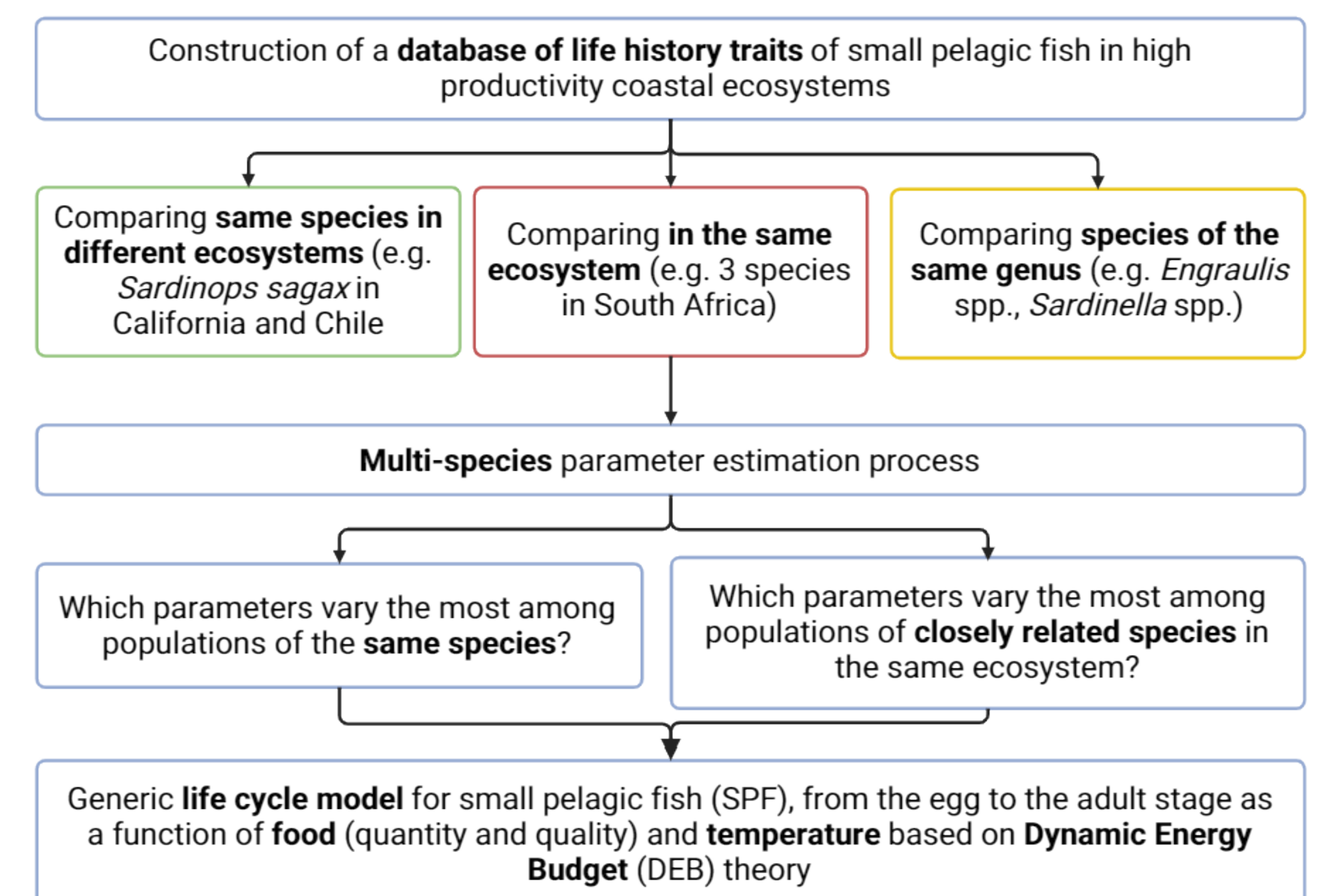
- Compare life history traits and reconstruct **inter-individual variability** in SPF communities in high-productivity ecosystems
- Unique and challenging comparative approach to **improve parameter estimation**
- Understand SPF life history traits, habitat characteristics, and individual responses to **environmental factors**
- Combining **ecological modeling** and field data analysis
- Advancement of knowledge in **marine ecology** and **fisheries science**, with implications for **sustainable management** of SPF populations.

PROPOSED RESEARCH APPROACH



Sardine
① Pacific sardine, *Sardinops sagax*
② Pilchard, *Sardina pilchardus*
Maderian sardinella, *Sardinella maderensis*
Round sardinella, *Sardinella aurita*
③ Japanese sardine, *Sardinops melanostictus*
④ Pacific sardine, *Sardinops sagax*
⑤ Benguela sardine, *Sardinops sagax*

Anchovy
① Northern anchovy, *Engraulis mordax*
② European anchovy, *Engraulis encrasicolus*
③ Japanese anchovy, *Engraulis japonicus*
④ Peruvian anchoveta, *Engraulis ringens*
⑤ Cape anchovy, *Engraulis capensis*



By comparing the life history traits of the most abundant species in different habitats or closely related species within the same system, the study seeks to **reduce uncertainty** due to **limited experimental data** availability and **reproductive processes** dependence on encountered environmental conditions (spawning by batch and undetermined fecundity) and obtain **more accurate parameter** sets for the model.

REFERENCES / ACKNOWLEDGEMENTS

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