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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 levels<sup>2</sup>.
- The abundance of SPF populations in high boundary productivity systems experiences **strong variations**, making their dynamics **difficult to predict**<sup>1</sup>.
- 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.

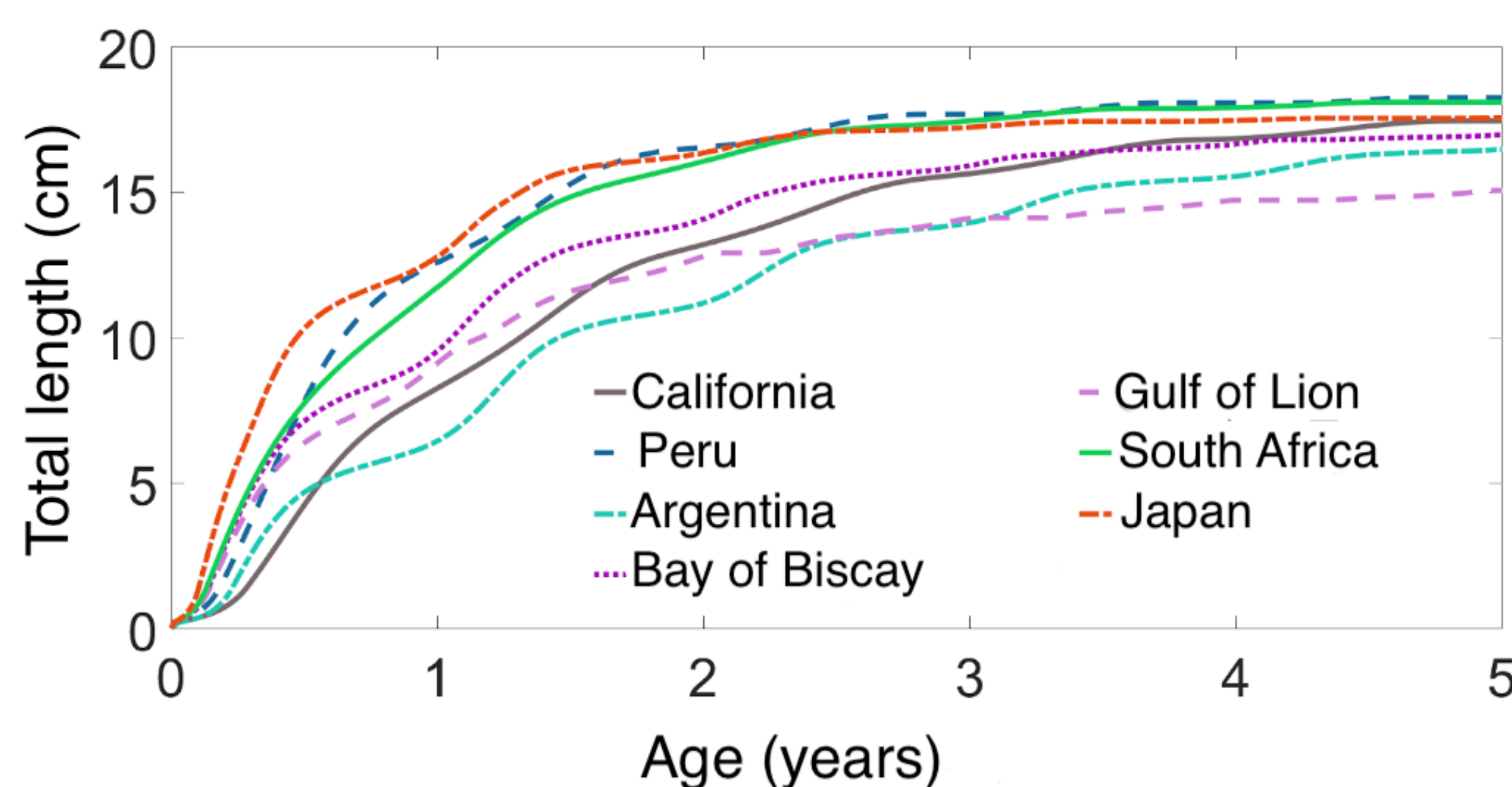
## RESEARCH QUESTION

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

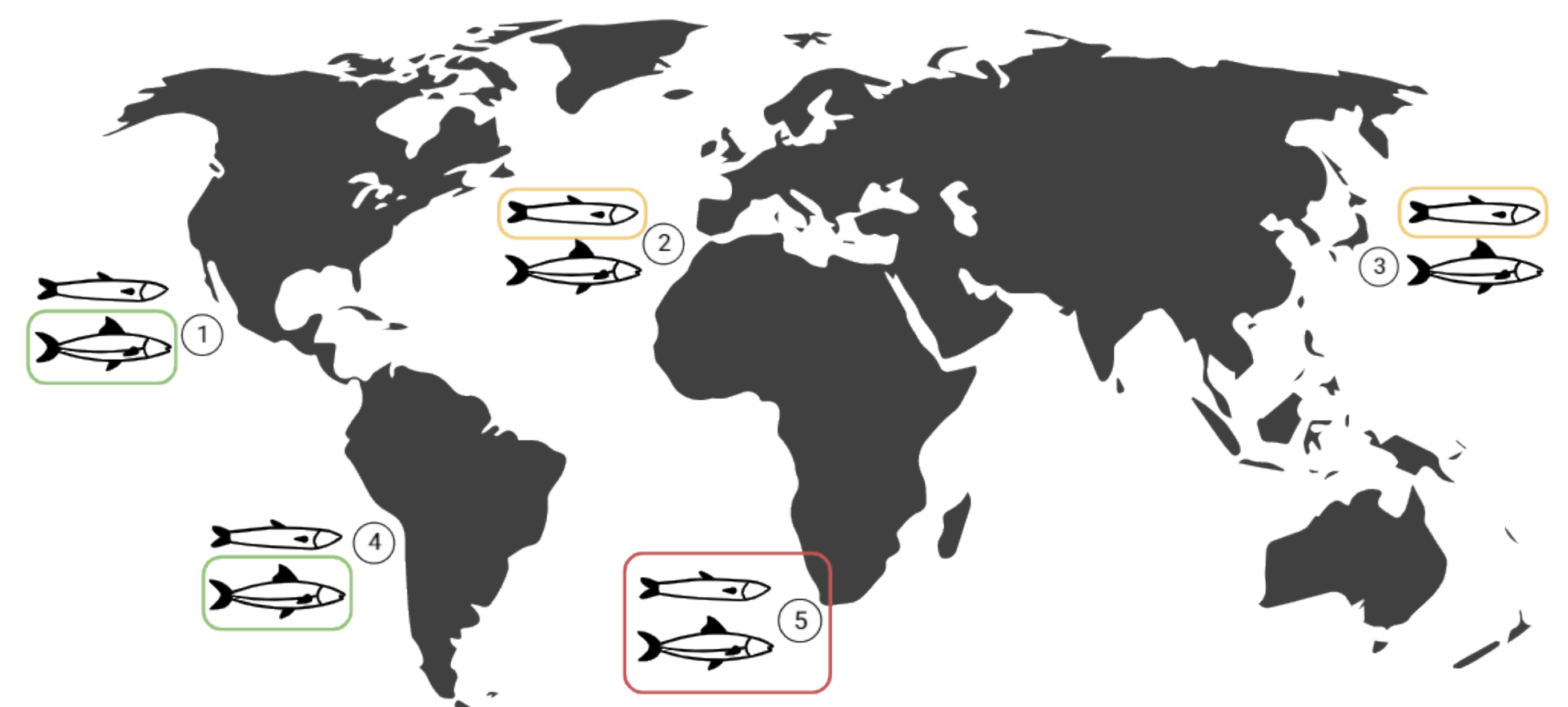


- 7 simulations = **7 major anchovy populations** of the genus *Engraulis* spp.
- 1 simulation = 1 average individual from a population with the **environmental conditions of its region**
- **Identical physiology**: same set of parameters for all populations

## CONCLUSION

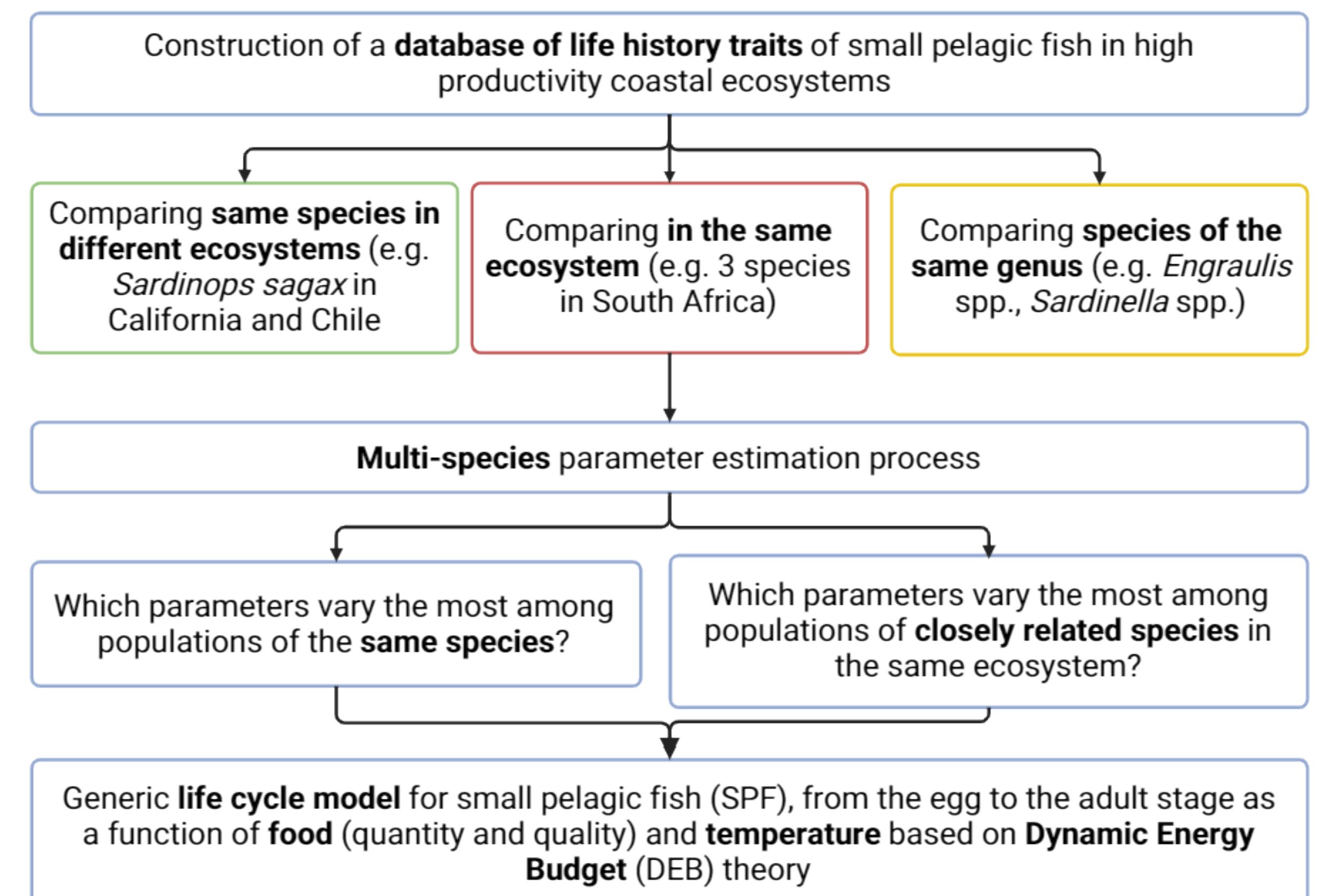
- Compare life history traits and reconstruct **inter-individual variability** in SPF communities in high-productivity ecosystems
- Unique and challenging comparative approach to **improve parameter estimation**
- Understand SPF life history traits, habitat characteristics, and individual responses to **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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