Are anchovies sizes shrinking? Results from twenty five year analysis of landings and research survey data

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INTRODUCTION

Small pelagic fish are short-lived and fast-growing, so their populations respond quickly to fluctuations in the environment, constituting excellent indicators of climatic changes (1).

The Argentine anchovy (*Engraulis anchoita*) constitutes, in terms of biomass, the most important fishery resource in the Southwest Atlantic (2). It has a wide distribution, from Cabo Frio in Brazil (23°S) to Patagonia (48°S) and at depths ranging from shallow waters to beyond the continental slope (3). Differences in growth parameters, natural mortality rates, morphometric characteristics, among others, suggest the existence, south of 34°S, of two fishing populations: northern and southern separated at 41ºS (4).

Aim: analyze the evolution of body condition and sizes of of the northern *stock* of Argentine anchovy (*Engraulis anchoita*) of research and landings data.

METHODOLOGY

Data source

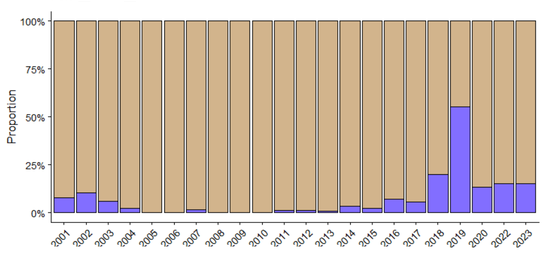
- Total area distribution: 34° - 41° LS.
- Landings in two ports between 2001 and 2023.
- Research surveys conducted by the INIDEP between 2001 and 2021.

Analysis

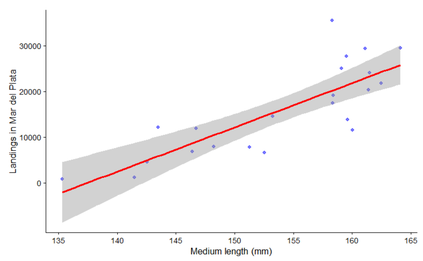
- $P = a * Lt^b$
- Kn = P/Pi relative condition factor (Le Cren 1951).
- Relationship between landing volumes per port.
- ANOVA test to evaluate differences between mean lengths, weights, and condition factor.
- A sequential regime change t-test analysis was performed on the series of total lengths and weights to detect changes.

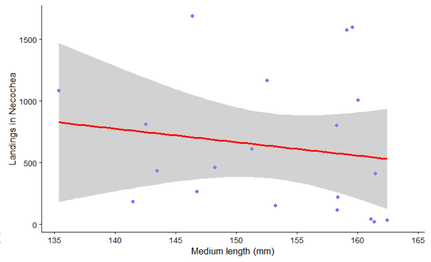
RESULTS

Relationship between port



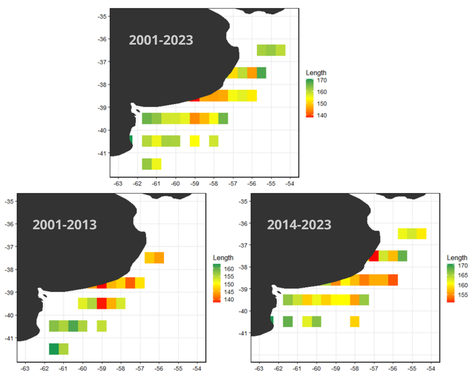
Significant differences were found in the correlation between the volumes landed in Mar del Plata and Necochea with the mean length.





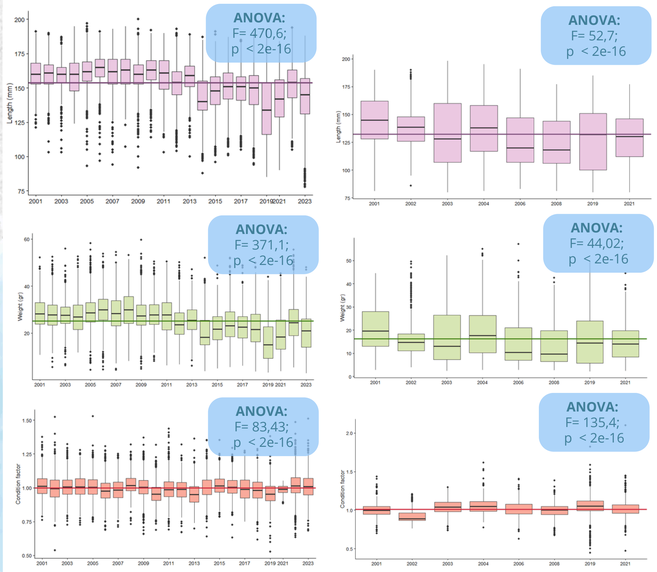
Changes in fishing operations

Fewer rectangles (0.25 mn^2 * 0.25 mn^2) were visited between 2014 y 2023. Those that were no longer visited were those where the average lengths of the anchovies caught were greater, while visits continued to be made to the rectangles where smaller specimens were caught.



Interannual variation

Landings: significant differences were found in mean length and mean weight between the years analyzed, revealing two distinct periods. The condition factor also varied, but with some stability.



Surveys: differences were found in the variables between the years analyzed, but no periods of change were evident.

The sequential analysis of lengths and weights allowed us to identify a change of regime. The year 2014 is the inflection point, with a significance of $p \leq \alpha$ (0,001). From that year onwards, the values for length and total weight are lower.

CONCLUSIONS

- The landings have tended to have a greater presence of specimens of smaller length and weight. These affect the activity of the canning and salting industry, since the market price of the matured product is related to the size of the specimens.
- We found that reduction in size of anchovies is related to the areas of operation of fishing vessels since the fuel price limit search time investment conducting to concentrate the activity in fishing zones closer to the landing ports.
- No changes were observed in the anchovy population with respect to decreases in length, weight, or condition factor. These, would indicate the absence of effects of the variables that affect it, such as food availability, dense-dependence and competition, physical factors and physiology, among others.

REFERENCES

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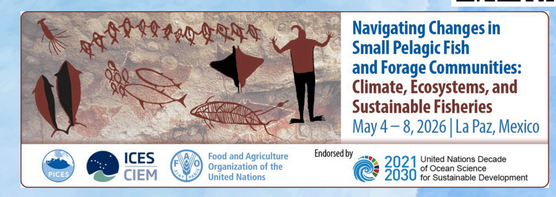

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