

Potential impact of predation by larval Spanish mackerel on larval anchovy in the central Seto Inland Sea, Japan

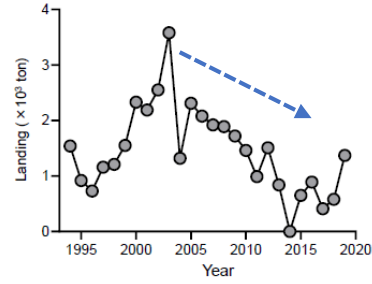
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Introduction

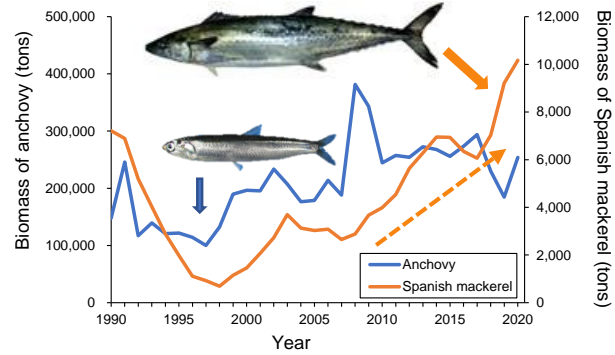
- Catch of larval Japanese anchovy has decreased in the central Seto Inland Sea, Japan, although egg abundance has been high in recent years (Fujita et al. 2021).
 → Reduced survival in larval anchovy.
- **Predatory Spanish mackerel has increased.**



Objectives: To evaluate the impact of predation by Spanish mackerel on larval anchovy.

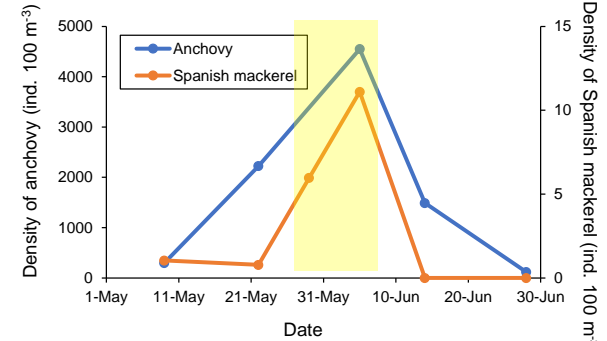


Landings of larval and juvenile anchovy in the study area (Fujita et al. 2021).



Biomass of anchovy and Spanish mackerel in the Seto Inland Sea (results of the stock assessment).

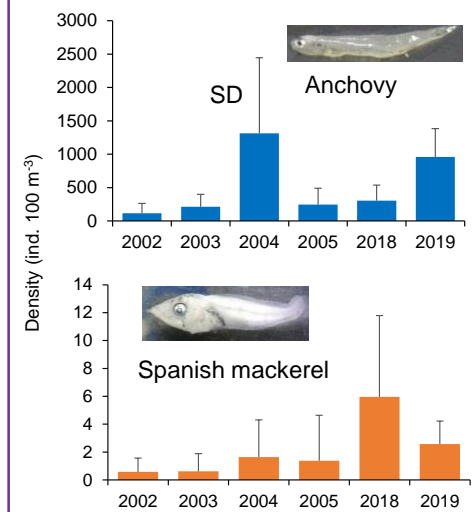
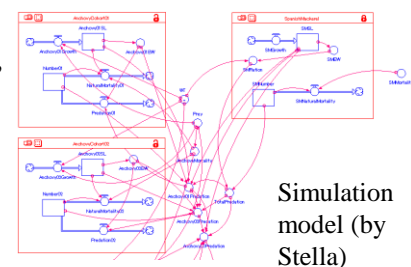
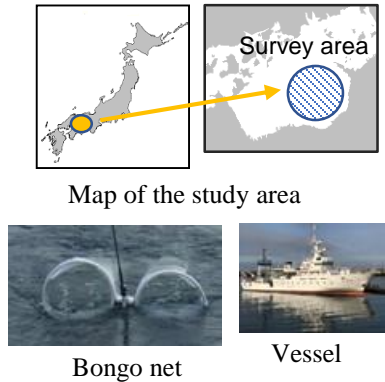
Results



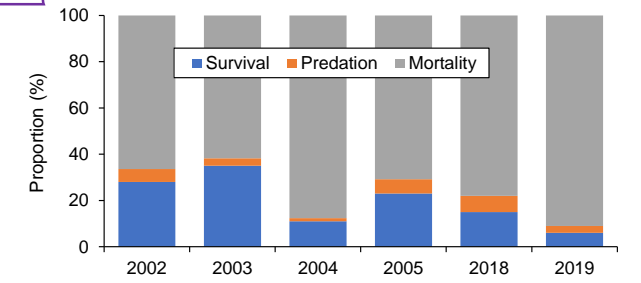
Seasonal changes in the larval densities in 2018. **Abundance of both anchovy and Spanish mackerel were high from late May to early June.**

Methods

- Abundances of larval Spanish mackerel and larval anchovy were investigated in May-June in 2018 and 2019.
- Bongo net was towed obliquely to cover all depths (ca. 0-20 m). Filtered water volume was recorded.
- Past data from surveys in 2002-2005 were used for comparison.
- Predation mortality of anchovy by Spanish mackerel was estimated using a simulation model constructed with the software Stella. Single cohort of Spanish mackerel and three cohorts of anchovy (born in early, middle, and late May) were set up. Parameters (feeding, growth, and mortality) were obtained from past studies (e.g. Shoji et al. 2001).
- Abundances of larval anchovy and Spanish mackerel in late May were used for the simulation.



Abundance of larvae in the study area in late May. Abundance of Spanish mackerel was greater in 2018-2019 than 2002-2005, indicating **higher predation ratio.**



Survival, predation by Spanish mackerel, and other mortality in larval anchovy. A total of 1.4-7.1% of larval anchovy were consumed by larval Spanish mackerel. **No evidence of increasing predation pressure in recent years.**

Conclusion

- Predation by larval Spanish mackerel accounted for decrease in the larval anchovy only a little.
- Recent decline in the anchovy recruitment would be attributed to other factors.