Seasonal dynamics in the diet of pelagic fish species in the south-western Baltic Proper

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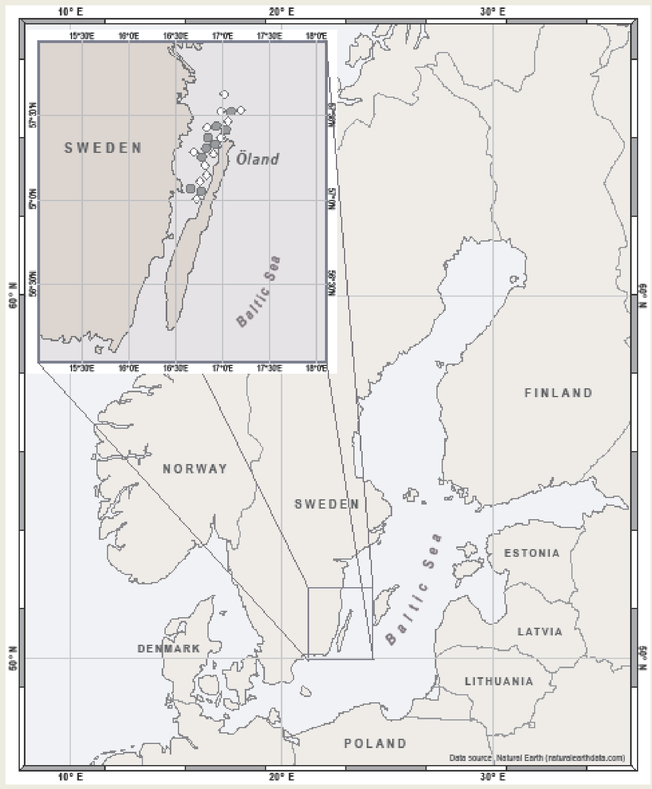
BACKGROUND

- In the western Baltic Sea the population of three-spined stickleback (*Gasterosteus aculeatus*) is increasing exponentially.
- Sticklebacks play a substantial role on *coastal* food webs in the Baltic by influencing lower trophic levels causing eutrophication symptoms [1-3].
- Little is known about the role of sticklebacks in the *offshore* Baltic Sea.

QUESTIONS addressed

1) what are the seasonal patterns of herring, sprat and three-spined stickleback diet?
2) do the diets of herring, sprat and stickleback overlap?
3) is there a preference for certain prey species in the three fish species?

WHERE was the material collected?

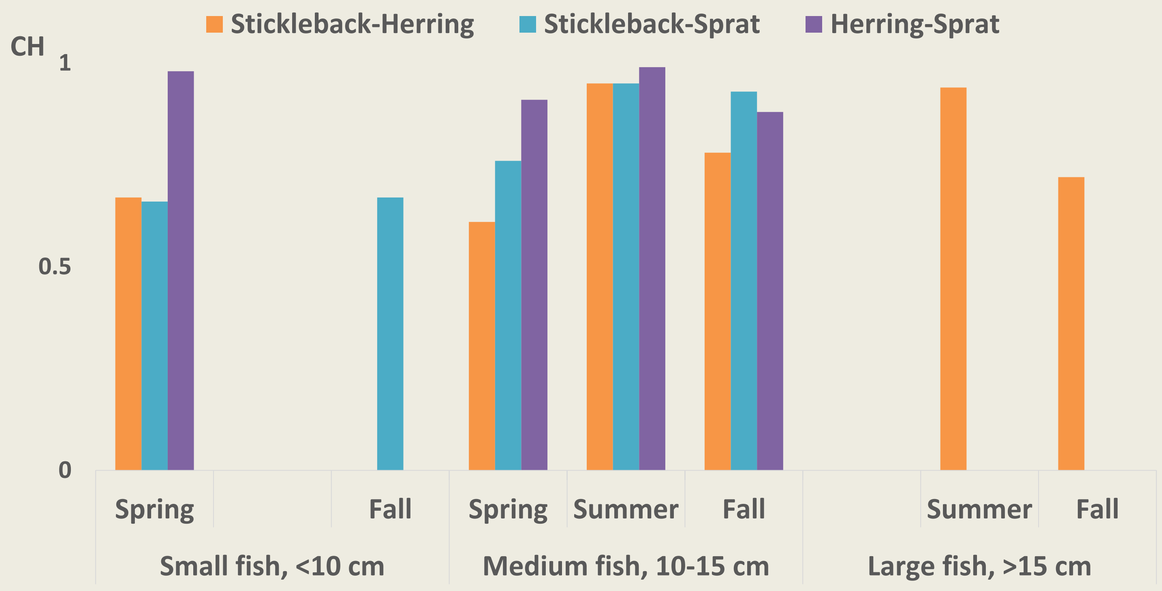


METHODS

- Fish (stickleback, sprat and herring) were collected by trawling (2009 – 2011, April – October) in pelagic offshore areas in Kalmar sound, south-western Baltic Proper.
- Visual inspection [4] of stomach contents (N=498).
- Zooplankton was sampled monthly in 2009 – 2010 by vertical tows using a WP2 zooplankton net with 90 µm mesh size [5].
- Relative importance of prey items was evaluated by estimating percentage composition by number (% N), diet overlap - by Morisita-Horn index (CH), diet selectivity – by V-index [6].

WHAT was found?

Substantial diet overlap

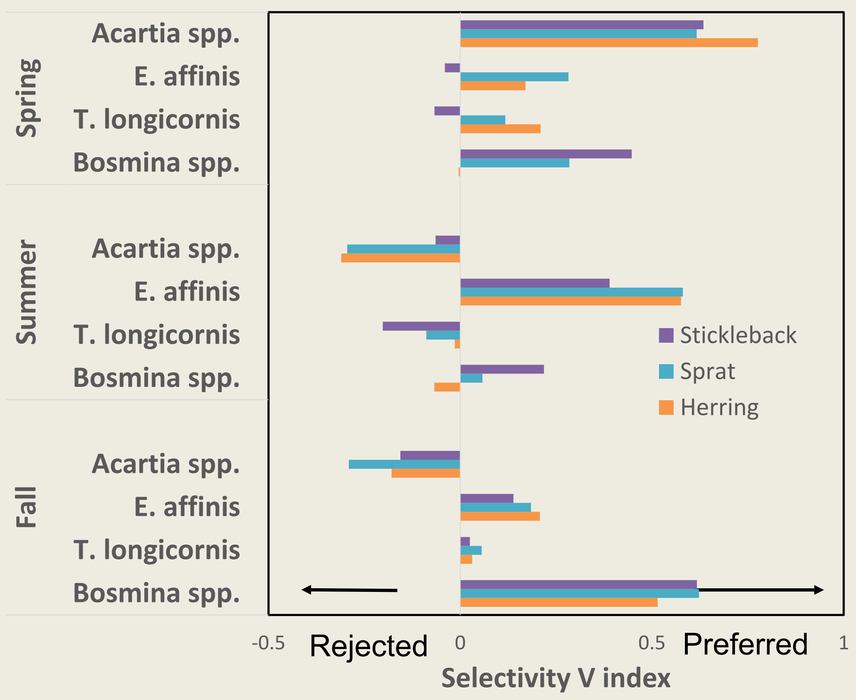


KEY messages

- In the spring, the majority of the herring and sprat diet consisted of *Temora longicornis*, while the diet of sticklebacks' mainly consisted of *Eurytemora affinis*.
- *E. affinis* made the most substantial contribution to the diet of all three fish species in the summer.
- In the fall the cladoceran *Bosmina* spp. was the most important prey for all fish species.

WHAT was found?

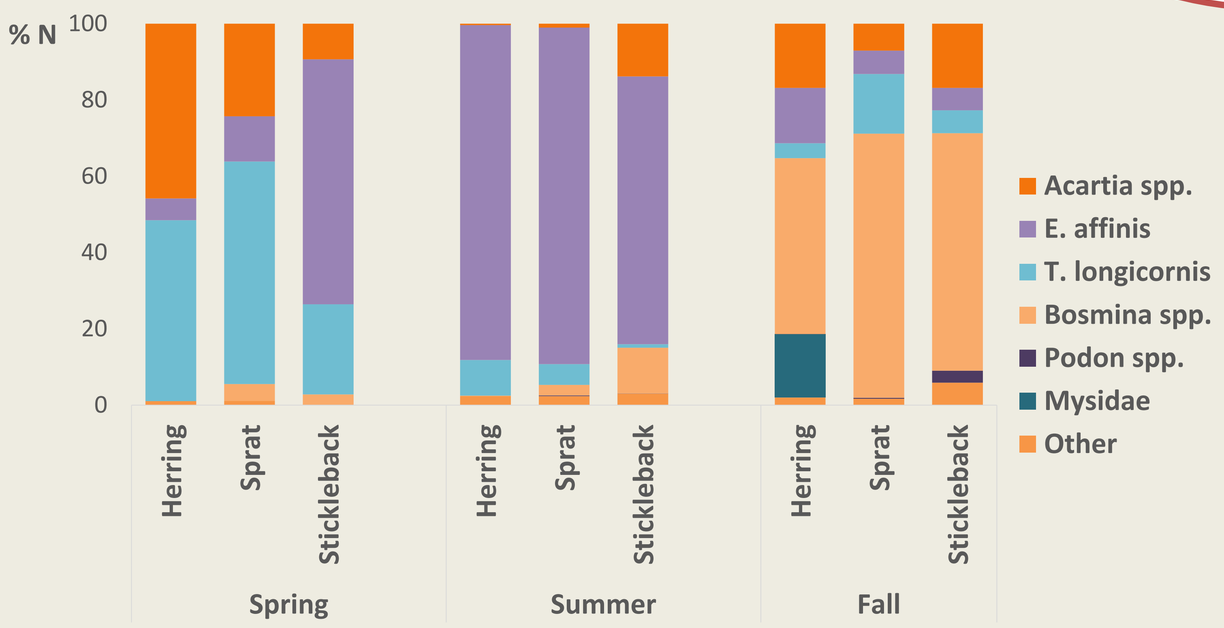
Highly selective behavior



Can three-spined sticklebacks be important food competitors for sprat and herring?

WHAT was found?

Strong seasonal differences in diet composition



KEY messages

- The highest diet overlap between the three species was found in the summer (94 – 99%), whereas a lower overlap was found in fall (67 – 93%), and spring (61 – 98%).
- A substantial diet overlap was even present between sticklebacks and larger (> 10 cm) herring and sprat.
- All fish species negatively selected *Acartia* spp. (except for during spring). *E. affinis* was mainly preferred in the summer, cladoceran *Bosmina* spp. was positively selected in fall, especially by sticklebacks.

IMPLICATIONS of the RESULTS

- Similar stomach content, high diet overlap and similar selectivity of all three species suggest that sticklebacks might be potential competitors to other planktivorous and commercially important fish species in the Baltic Sea.

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ACKNOWLEDGEMENTS

We are grateful for the collection of samples carried out by personnel at the Department of Aquatic Resources, Swedish University of Agricultural Sciences. Data were collected within the Swedish PLAN FISH project.