Trophic interactions of invasive round goby *(Neogobius melanostomus)* and Baltic herring eggs

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The Ponto-Caspian round goby (*Neogobius melanostomus* Pallas, 1814) invaded many European waters. Predation on spawn of native species and impacts on their recruitment success have been described in several studies. Considering the opportunistic feeding behavior of round gobies and their spatial overlap with herring eggs during the spring spawning season in the Baltic Sea, we investigated whether round gobies feed on these eggs.

Conclusion

While herring eggs were not consumed by large round gobies, they formed a significant proportion in the stomach contents of small round gobies. Future studies should focus on the potential herring egg predation of small round gobies (< 10 cm total length).

Unexpectedly, large round gobies in our experiments preferred motile prey items (such as *C. crangon* and *Idotea sp*.) over their documented usual prey (mollusks such as the offered *M. edulis*). Further research on trophodynamic interactions of round goby should consider prey-specific characteristics (e.g. motility) and their effect on the round gobies' feeding behavior.

Laboratory experiments – Food preference

Methods:

Herring eggs, *Mytilus edulis* and *Crangon crangon* were offered in different treatments and consumption of round gobies (total length 16.46 cm ± 2.24 SD) were compared statistically.

Results:

Round gobies preferred *Crangon crangon*. *Mytilus edulis* was preferred if *Crangon crangon* was absent. No herring egg consumption was observed (Fig. 1).

Field samples – Stomach content analysis

Methods:

Samples were collected in a German lagoon (Greifswalder Bodden) during the spawning season of the Atlantic herring. Round gobies were sampled in the spawning area and stomach content analyses were performed in the laboratory.

Results:

Small round gobies preferred herring eggs (RI = 26.2 %), in contrast to large round gobies which preferred *Idotea sp.* (RI = 25.85 %) (Fig. 2).

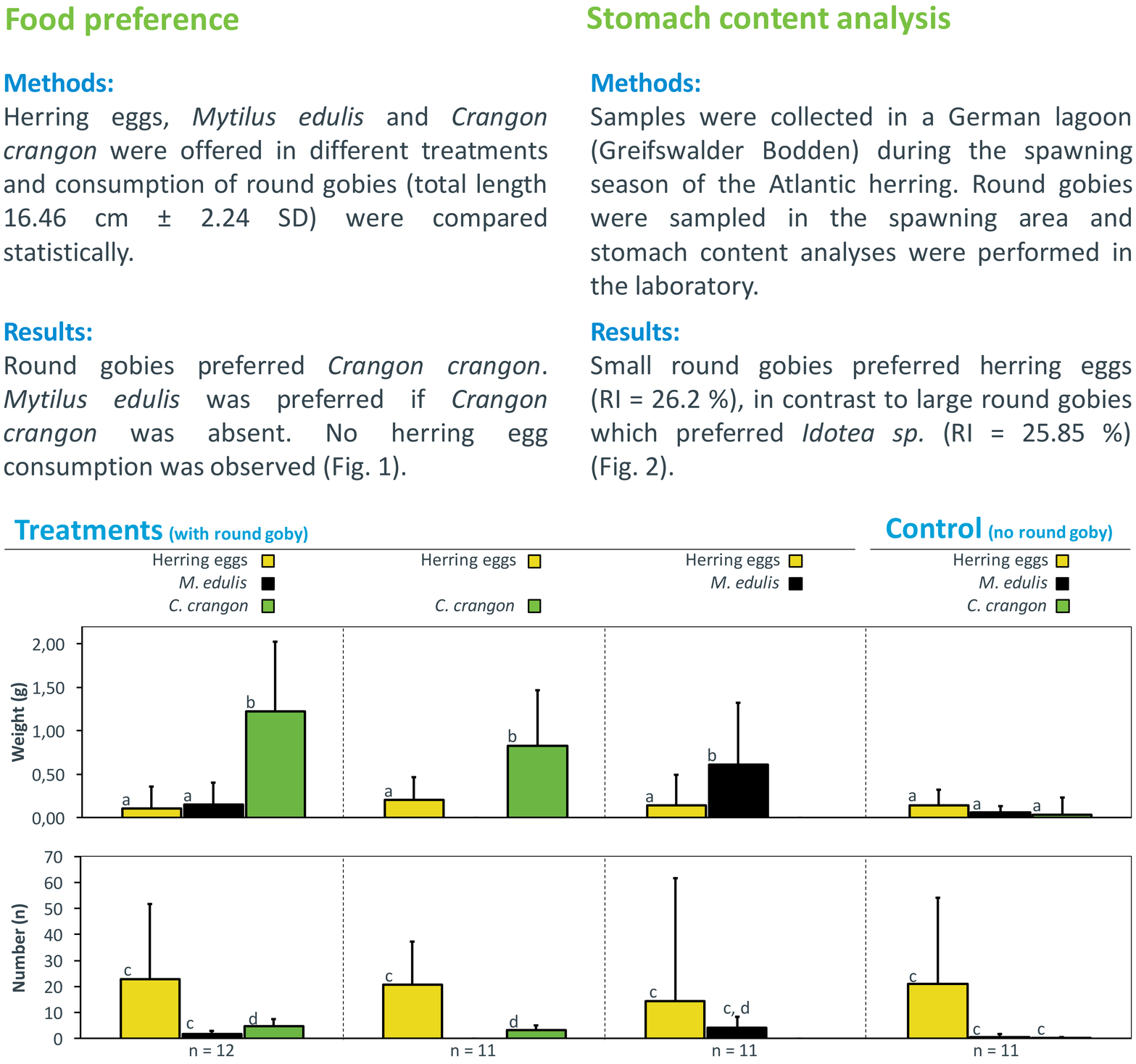
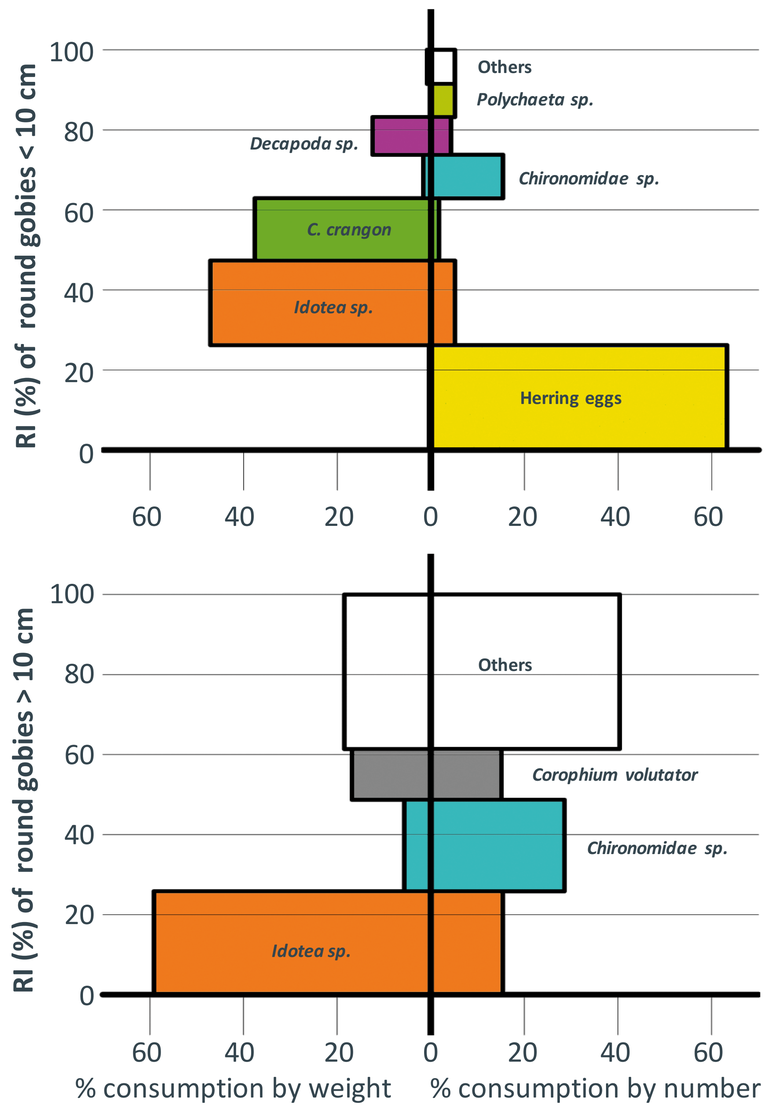


Figure 1: Mean consumption and positive Standard Deviation (SD) of single placed round gobies in 20 l aquaria in a period of 1 hour. Homogenous subsets (ANOVA, related t-test, U-test) are labelled with lowercase letters (a, b, c, d).

Importance of prey types



RI_i = Relative Importance
AI_i = Absolute Importance
O_i = % Consumption by Occurance
n_i = % Consumption by number
w_i = % Consumption by weight

$$RI_i = 100 * AI_i \Big/ \sum_{i=1}^{n} AI$$

$$AI_i = O_i + n_i + w_i$$

Figure 2: Relative Importance (RI) (George & Hadley 1979) of prey items from small round gobies (<10 cm, n = 25) and large round gobies (>10 cm, n = 36), being caught in the field.

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