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Spatial variability in zooplankton and feeding of larval Atlantic mackerel (*Scomber scombrus*) in the southern Gulf of St. Lawrence

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The copepods *Oithona similis* and *Temora longicornis* are very important in the diet of larval Atlantic mackerel in the southern Gulf of St. Lawrence and are generally positively selected by the larvae. Results of this study should be considered to adjust the predictive model of Atlantic mackerel recruitment based on copepod production.

1. Introduction

In fishes, availability of adequate zooplankton prey during the larval stage is a key factor for the emergence of a strong year-class.

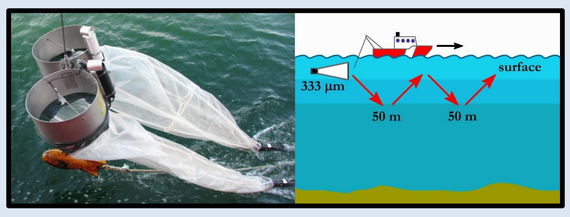
A model based on the production of three copepod species (*Calanus finmarchicus*, *Pseudocalanus* spp. and *Temora longicornis*) was proposed in order to predict Atlantic mackerel recruitment, a commercially exploited fish in the southern Gulf of St. Lawrence (Castonguay *et al.* 2008).

However, inconsistencies exist in the literature on the importance of the three copepod species in the diet of Atlantic mackerel larvae in the southern Gulf (Ringuette *et al.,* 2002; Robert *et al., 2008*).

General objective: **<u>to examine the influence of various assemblages of copepod prey on the feeding of Atlantic mackerel larvae in the southern Gulf of St. Lawrence.</u>**

2. Methods

Fish larvae and zooplankton were sampled on a grid of 65 stations covering the entire southern Gulf of St. Lawrence in June 2008 and July 2010.



Fish larvae were collected using a multiple-oblique 333 µm Bongo net tow. Samples were kept in 95% ethanol in 2008 while frozen in 2010. Zooplankton was collected using a vertical 73 µm conical net tow.

Zooplankton in the sea and in the gut was identified to the lowest taxonomic level and developmental stages were determined when possible.

Feeding selectivity of mackerel larvae was measured by comparing zooplankton prey in their gut content to zooplankton found in the sea using Chesson's α selectivity index (Chesson 1978).

3. Zooplankton assemblage

A cluster analysis revealed 4 significant groups of station (A-D) based on zooplankton species composition.

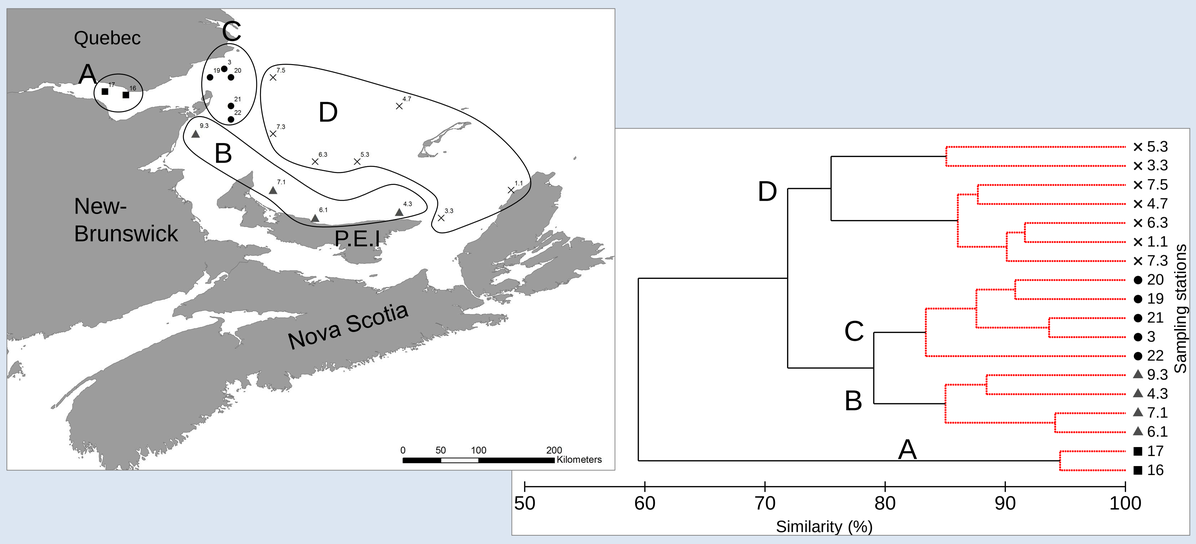


Fig.1. Zooplankton species assemblages in the southern Gulf of St. Lawrence.

	Zooplankton abundance (no·m^{-2})			
Prey taxa	A	B	C	D
Oithona spp.	2 543 933	2 219 206	3 364 459	3 108 232
Pseudocalanus spp.	2 517 653	342 451	1 153 504	763 740
Temora spp.	359 054	609 220	248 282	459 589
Calanus finmarchicus	18 640	88 414	207 996	460 098

4. Diet composition

The diet of the 3.5-5.4mm and the > 5.4 mm size-class was dominated by *Oithona* spp. N and *T. longicornis*.

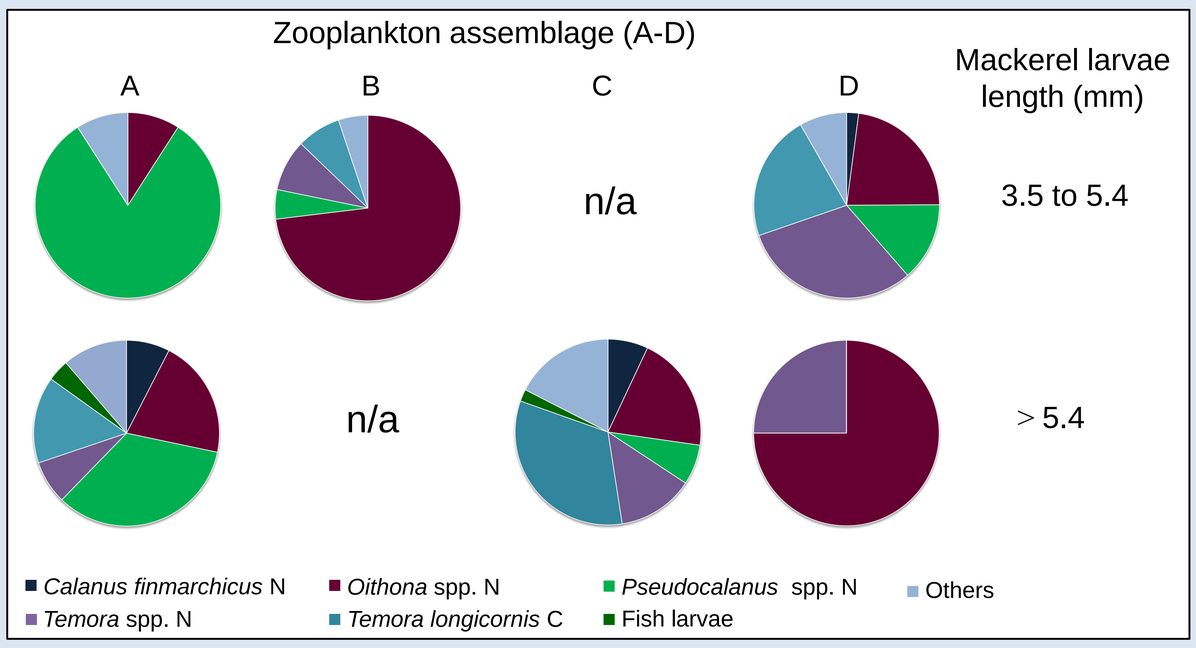


Fig. 2. Diet composition of larval Atlantic mackerel expressed as the percent in number of the different prey taxa by length classes of larvae and zooplankton assemblages.

5. Feeding selectivity

Mackerel larvae exhibited negative selectivity against *Pseudocalanus* spp., except for larvae from the 3.5-5.4 mm size-class of the assemblage A, where the copepod was very abundant.

Most of the larvae selected positively *Oithona* spp. and *Temora* spp. nauplii.

Larvae did not feed much on *C. finmarchicus* but the selectivity for this prey was significantly positive in the assemblage C.

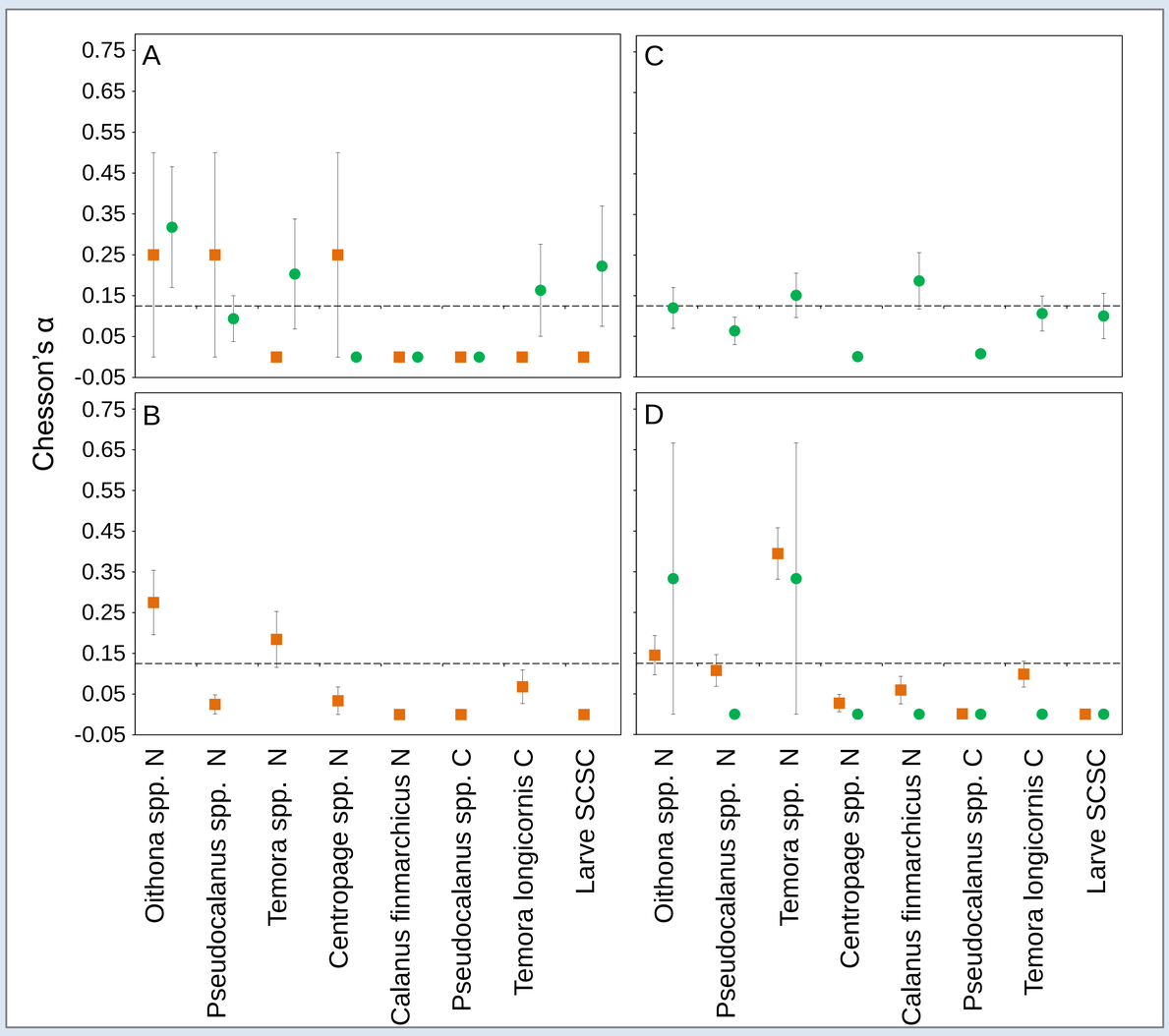


Fig. 3. Chesson's α selectivity index of Atlantic mackerel larvae for assemblage A-D and for length-classes 3.5 – 5.4 mm (■) and > 5.4mm (●). Dotted line indicates minimum threshold value (1/N) for a random selection as describe by Chesson (1978). Errors bars represented standard errors.

6. References

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