

Reveal diversity and temporal variability of marine planktonic ciliates using metabarcoding

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Introduction

Three orders of ciliates (Strombidiida, Chreotrichida and Tintinnida) are major components of marine microzooplankton and they function as important trophic links in microbial food webs. The abundance of planktonic ciliates can be up to 10^6 cells \cdot L⁻¹ in the upper water layers (Chiang et al. 2003). In a previous large diversity study (Tara Ocean voyage, Gimmmler et al. 2016), they represented a total of 48% in OTUs and 35% in reads of the phylum Ciliophora.

We monitored the seasonal dynamics of planktonic ciliates community using metabarcoding in a temperate coastal site (SOMLIT-Astan, Lat 48 ° 46'18 " N, Long 3 ° 58'6 " W, Figure 1) in the western English Channel every two weeks over three years (2009-2011).

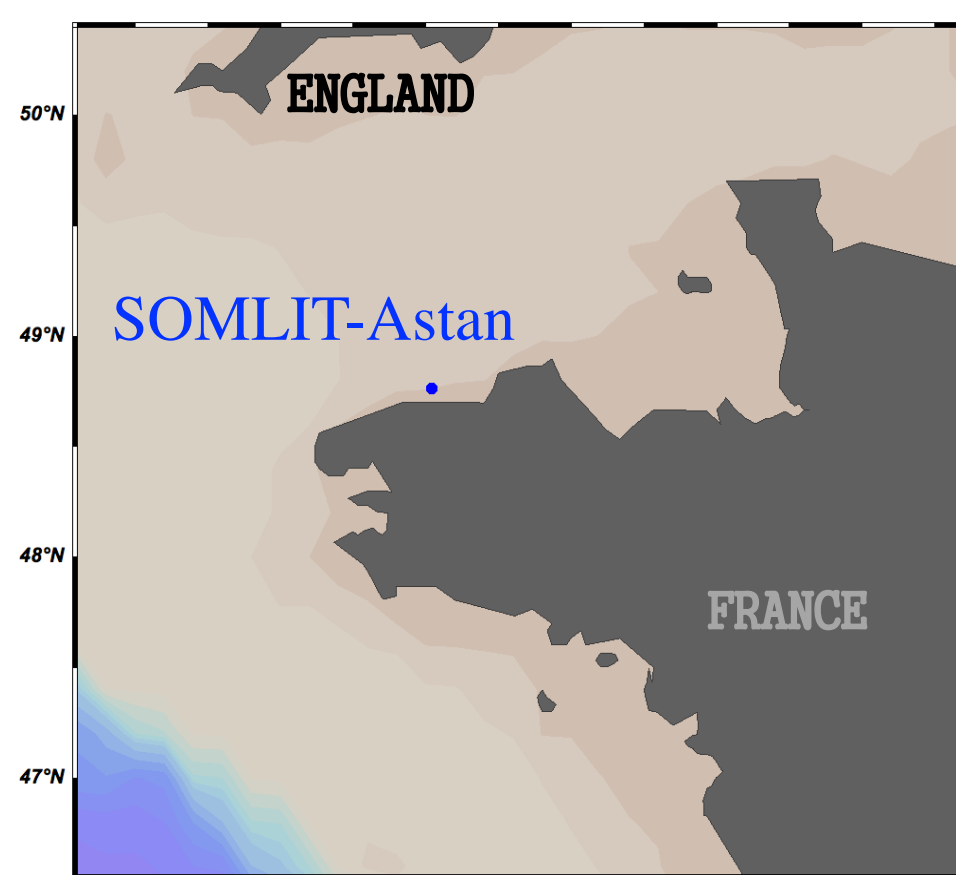


Figure 1. Location of sampling site, SOMLIT-Astan.

Results – Overall community composition

- Obtained 4.6 millions reads, 21251 OTUs in total
- Reads and OTUs of planktonic ciliates community are 19943 and 646.

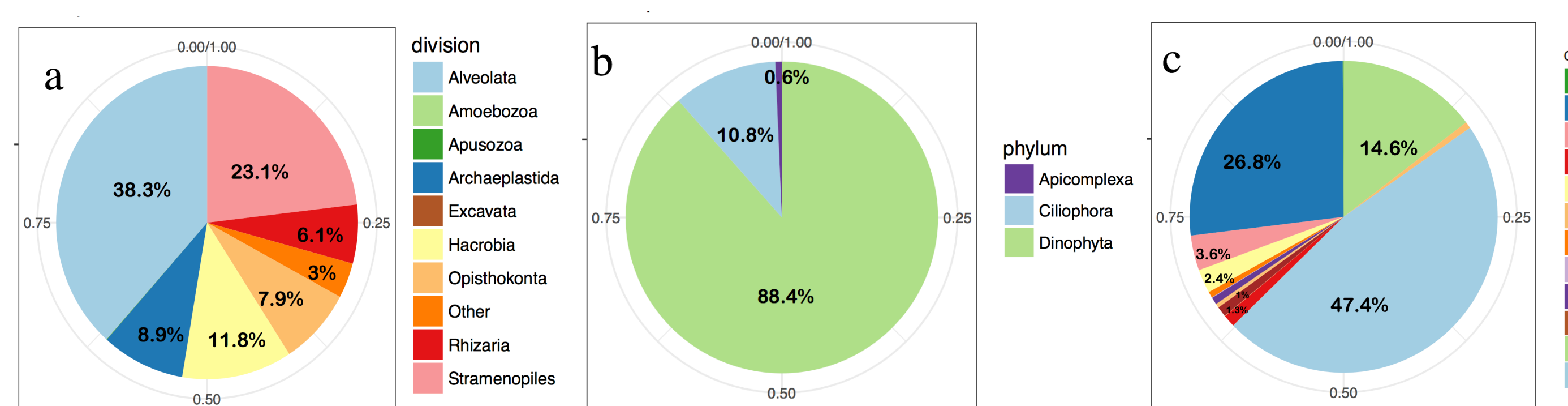


Figure 2. Pie charts showing the contribution of all eukaryotes at (a) division-level taxa and planktonic ciliates at (b) phylum-level taxa and (c) order-level taxa at SOMLIT-Astan time-series site. Affiliation was performed according to the PR2 database (Guillou et al. 2013).

Result – Temporal pattern of planktonic ciliate communities

- The NMDS plot showed cyclic pattern of planktonic ciliate diversity (more explicit in winter). The communities tend to be more similar between years when sampled during the same season (Figure 3).

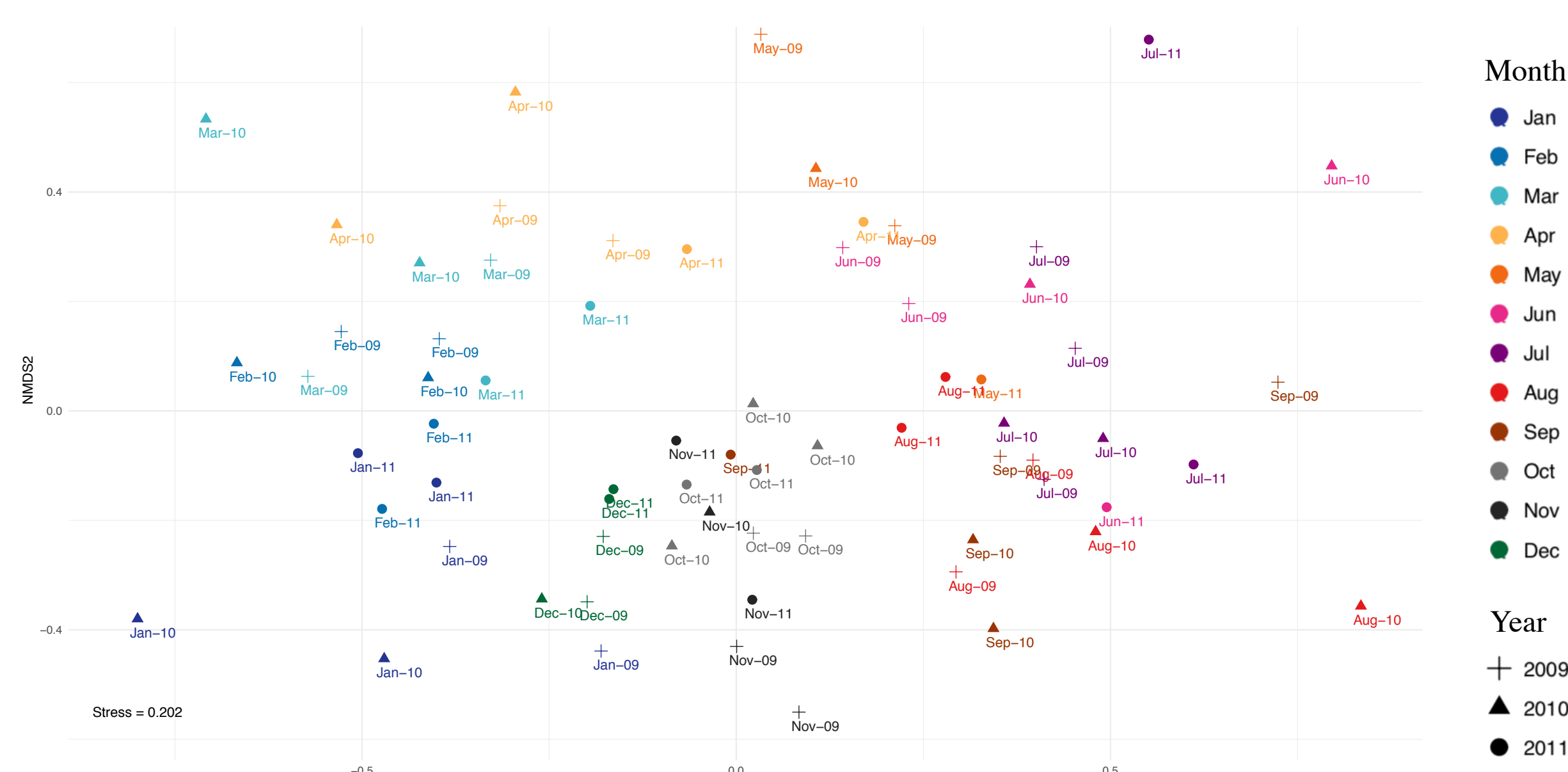


Figure 3. Non-metric multidimensional scaling (NMDS) plot based on Bray-Curtis dissimilarities of planktonic ciliates community at SOMLIT-Astan time-series site.

Results – Seasonal variations

- The seasonal changes of chlorophyll a was not synchronous with ciliates communities except in September 2010 and July 2011.
- These 2 peaks of chlorophyll a correspond to a low shannon index caused by the relative strong abundances of reads assigned to *Tintinnopsis major* and Strombidiida (Figure 4).

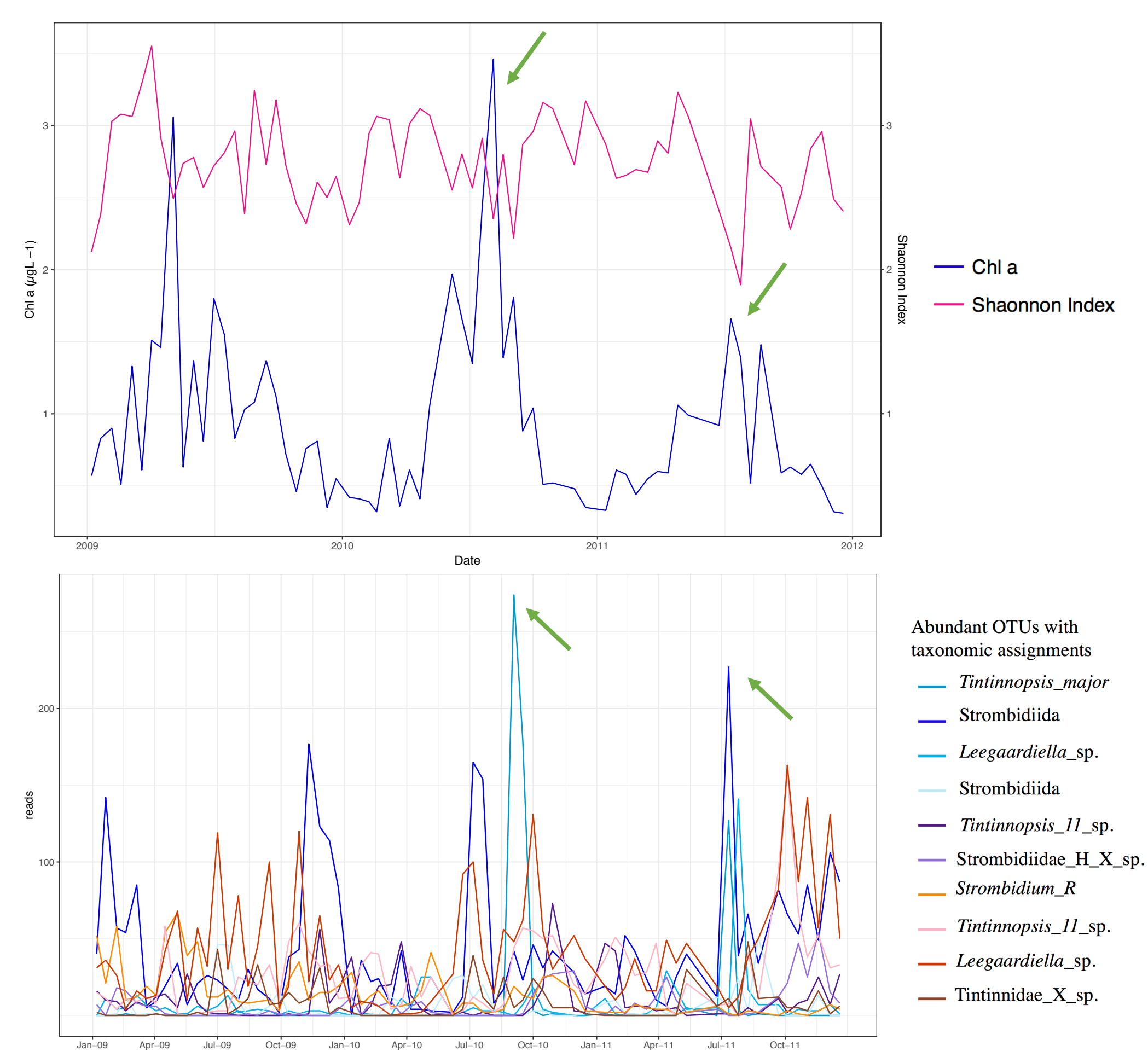


Figure 4. Seasonal variations of (a) the Shannon index (b) abundant OTUs of ciliates communities at the SOMLIT-Astan time-series site. The green arrow indicates the peaks of chlorophyll a and planktonic ciliates abundant OTUs.

Conclusion & Future work

This study showed seasonal variability in planktonic ciliate communities and high repeatability between years (more obvious in winter). The next goal would be to combine with another dataset to compare the temporal and spatial effects on coastal planktonic ciliates communities.

References & Acknowledgements

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