



HAL
open science

Seasonal dynamic of benthic communities in coastal marshes (Charente-Maritime, France)

Clélia Duran, Andréa Bouchard, Christine Dupuy, Hélène Agogué, Robert Duran, Cristiana Cravo-Laureau

► **To cite this version:**

Clélia Duran, Andréa Bouchard, Christine Dupuy, Hélène Agogué, Robert Duran, et al.. Seasonal dynamic of benthic communities in coastal marshes (Charente-Maritime, France). 18th International Symposium on Microbial Ecology (ISME 18), Aug 2022, Lausanne, Switzerland. . hal-04295308

HAL Id: hal-04295308

<https://hal.science/hal-04295308>

Submitted on 20 Nov 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial - ShareAlike 4.0 International License

Seasonal dynamic of benthic communities in coastal marshes (Charente-Maritime, France)

Clélia Duran^{1,2}, Andréa Bouchard², Christine Dupuy², Hélène Agogué², Robert Duran¹, Cristiana Cravo-Laureau¹

¹ Université de Pau et des Pays de l'Adour, IPREM UMR 5254

² Université de La Rochelle, LIENSs UMR 7266

INTRODUCTION

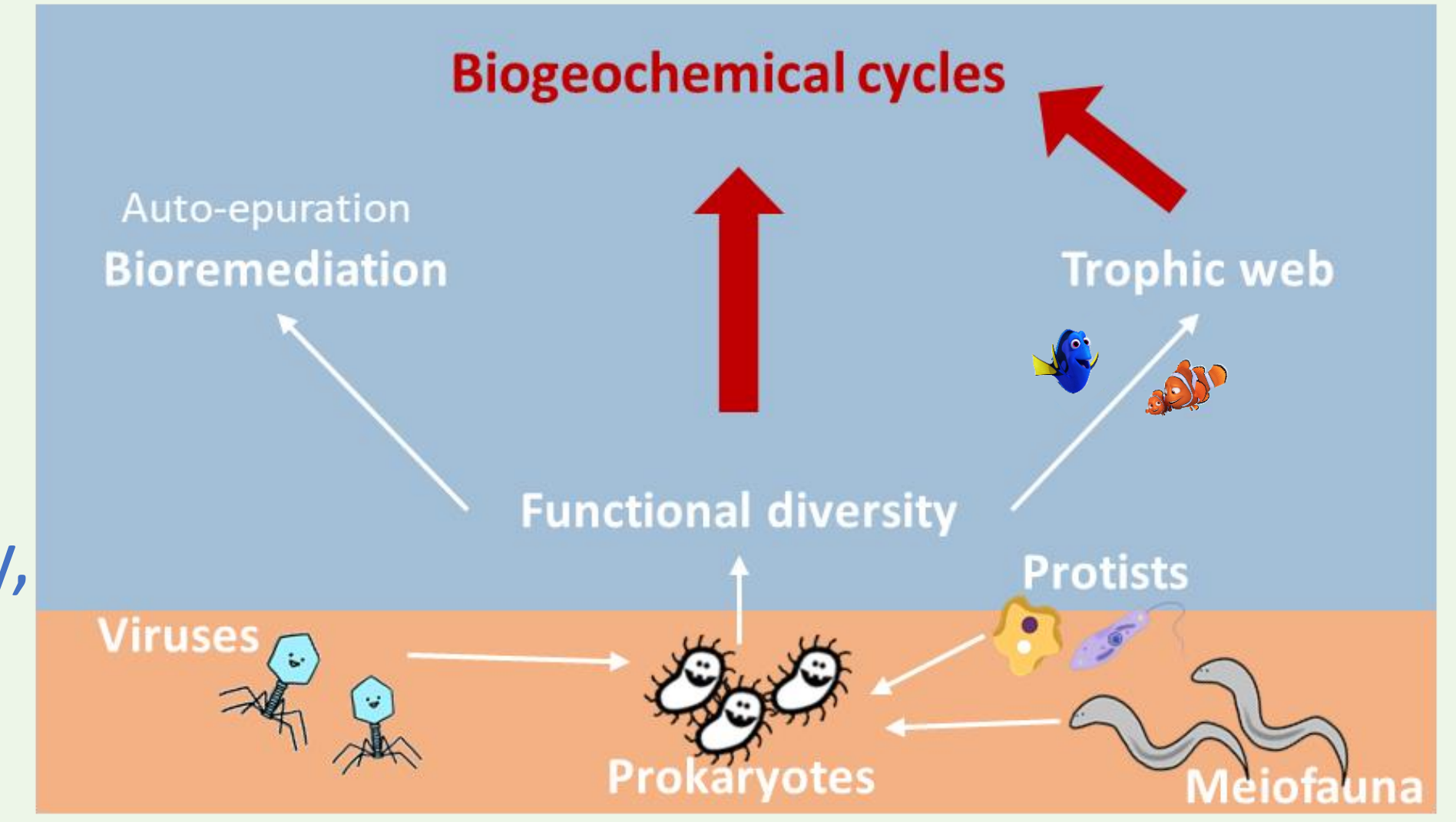
Marshes environments

- Vast diversity of environment and habitats
- Ensure ecosystem services thanks to their microbial communities
- Largely exploited for human activities
- Impacted by climate change and human activities



Microbial benthic communities

- Are at the basis of trophic webs in sediments thanks to their functional diversity
- Regulated by biotic parameters such as trophic interactions
- Affected by abiotic parameters (e.g. salinity, temperature, light, nutrients, pollutants,...)



Assessing the seasonal dynamics of marshes with different salinities in order to better understand parameters regulating benthic communities interaction and abundances

METHODS

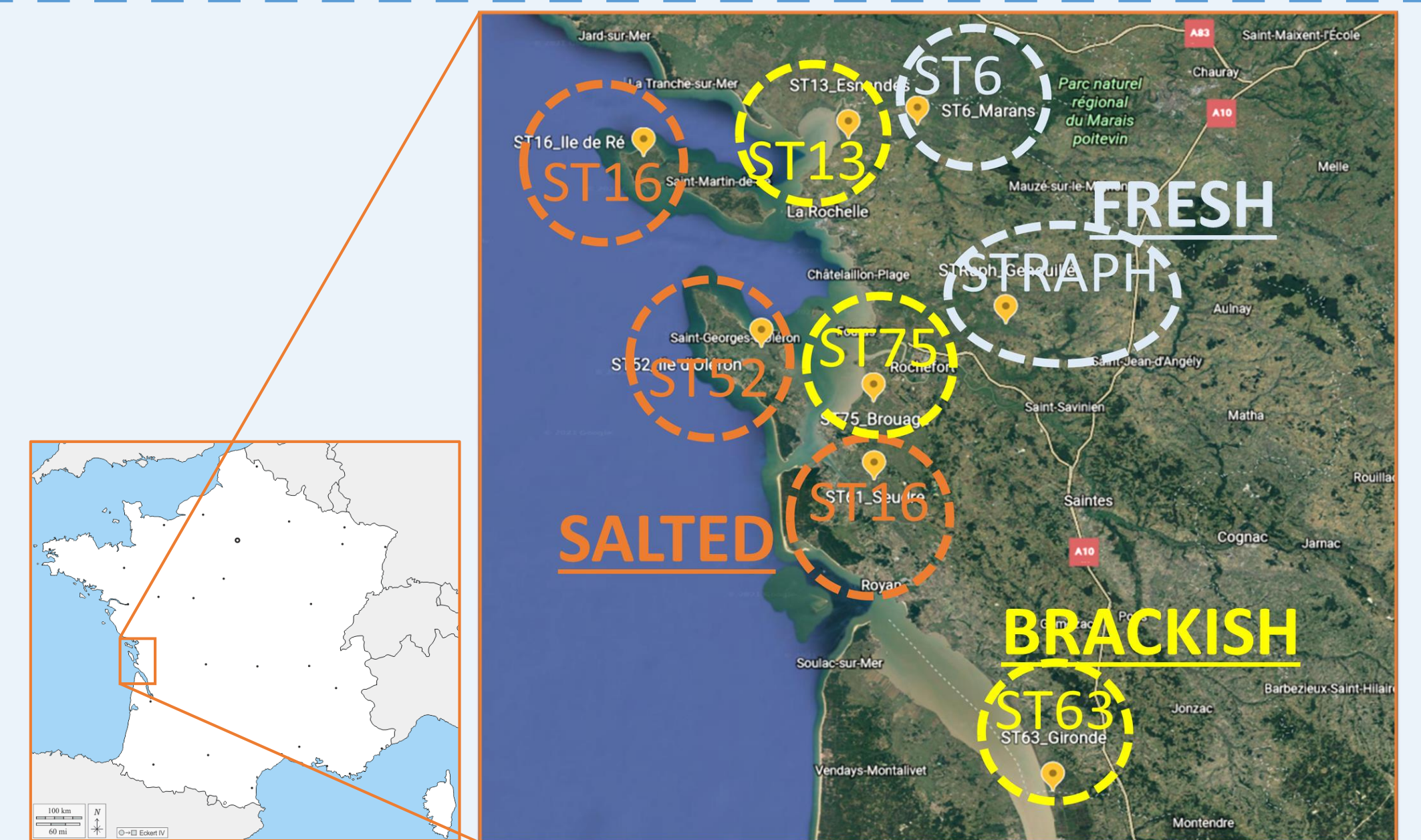
A four season monitoring comparing 8 Marshes of various salinities analysing

Biotic parameters

- Prokaryotic abundance (flow cytometry)
- Meiofaunal abundance and diversity (magnifying glass)
- Chlorophyll *a* biomass (fluorimetry)

Abiotic parameters

- Nutrients (NH_4^+ / NO_3^- / NO_2^- / PO_4^{3-} / Si)
- *In situ* parameters (pH/RedOx/Salinity/Temperature)
- Metals
- Granulometry
- Water content
- Dissolved Organic Carbon (DOC)



RESULTS

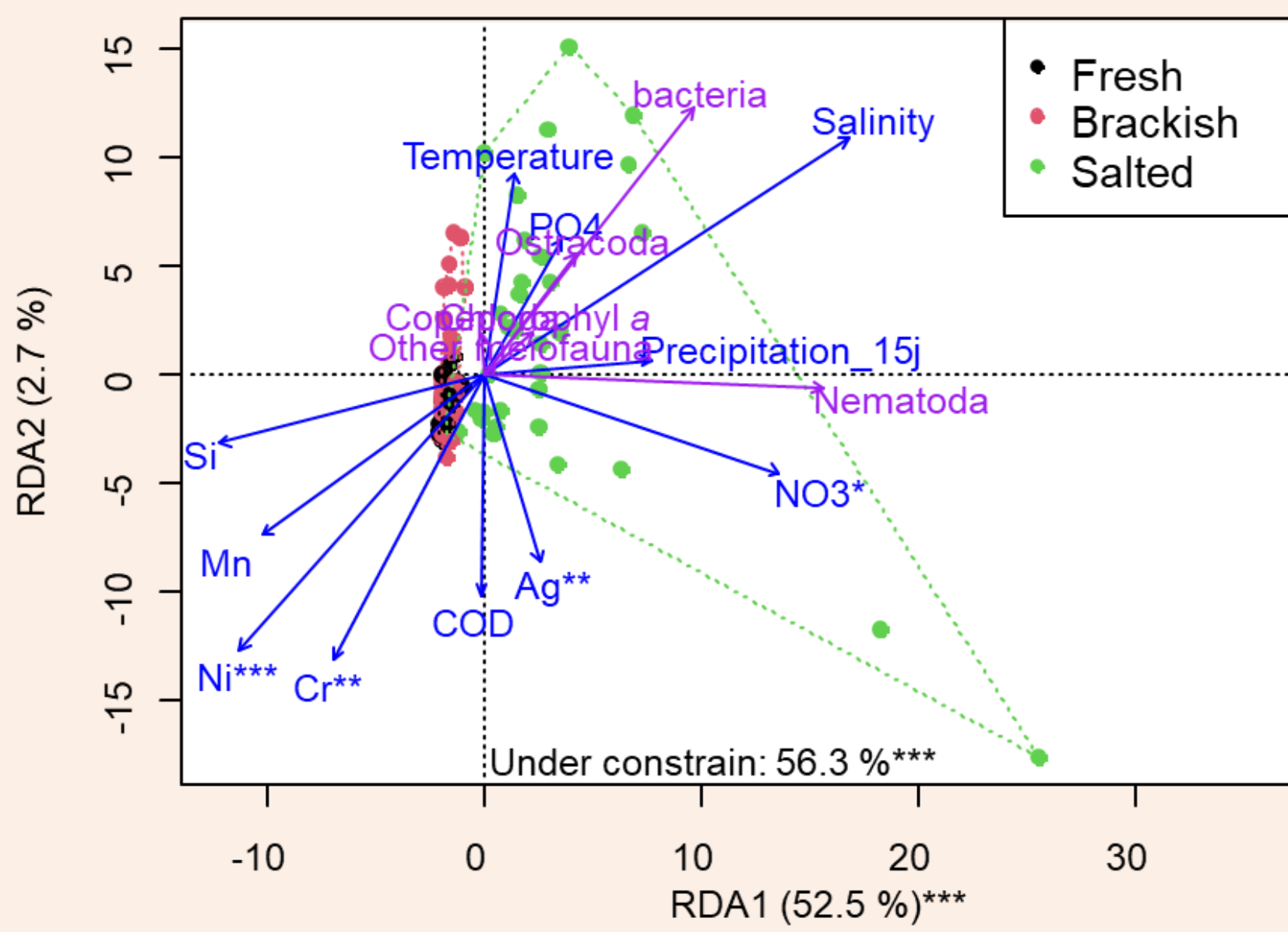


Fig 1: RDA analysing biotic parameters against abiotic factors for all sites. Significativity was tested with ANOVA (***) < 0.001 ; ** < 0.01 ; * < 0.05 .

Separation of the samples depending on salinity

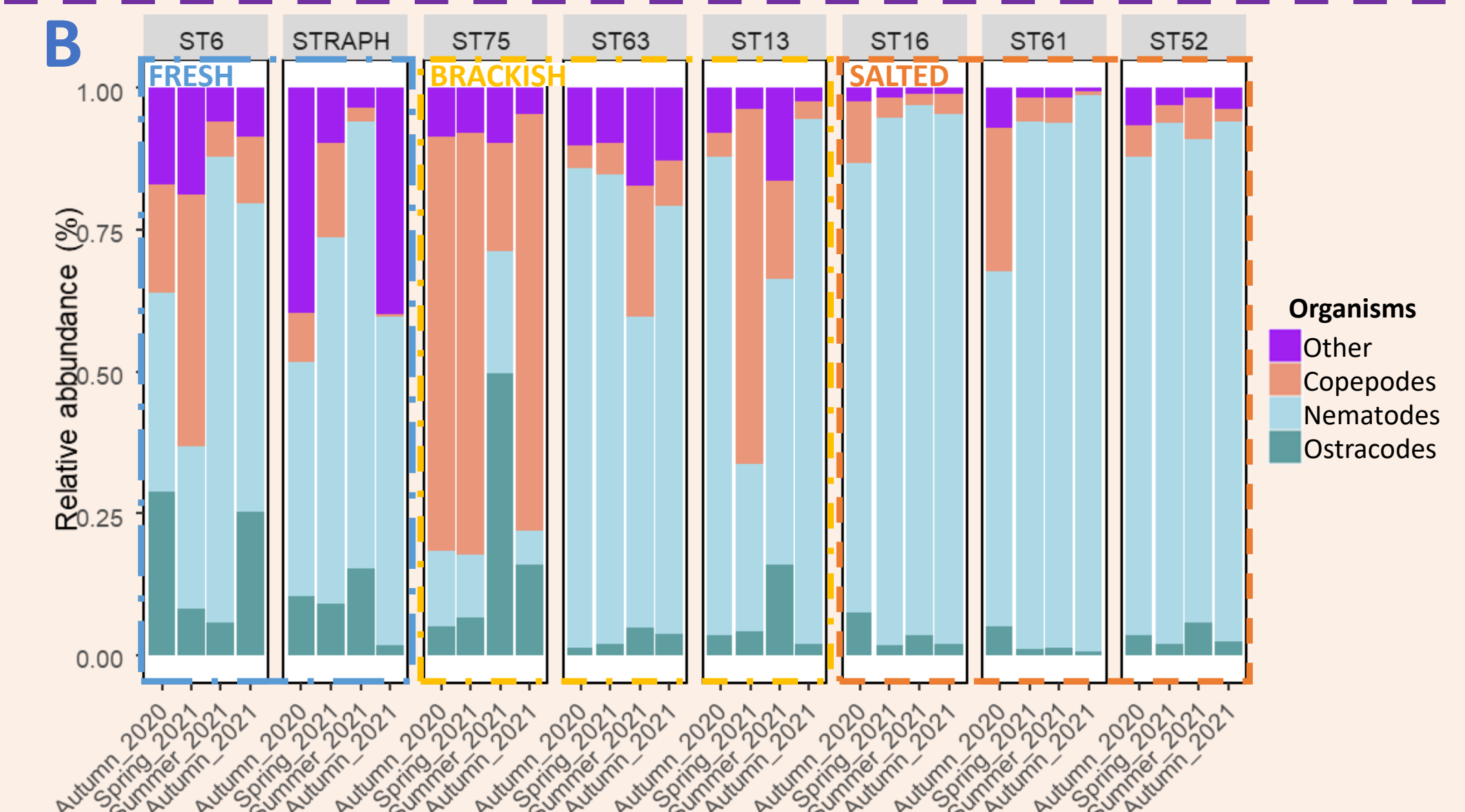
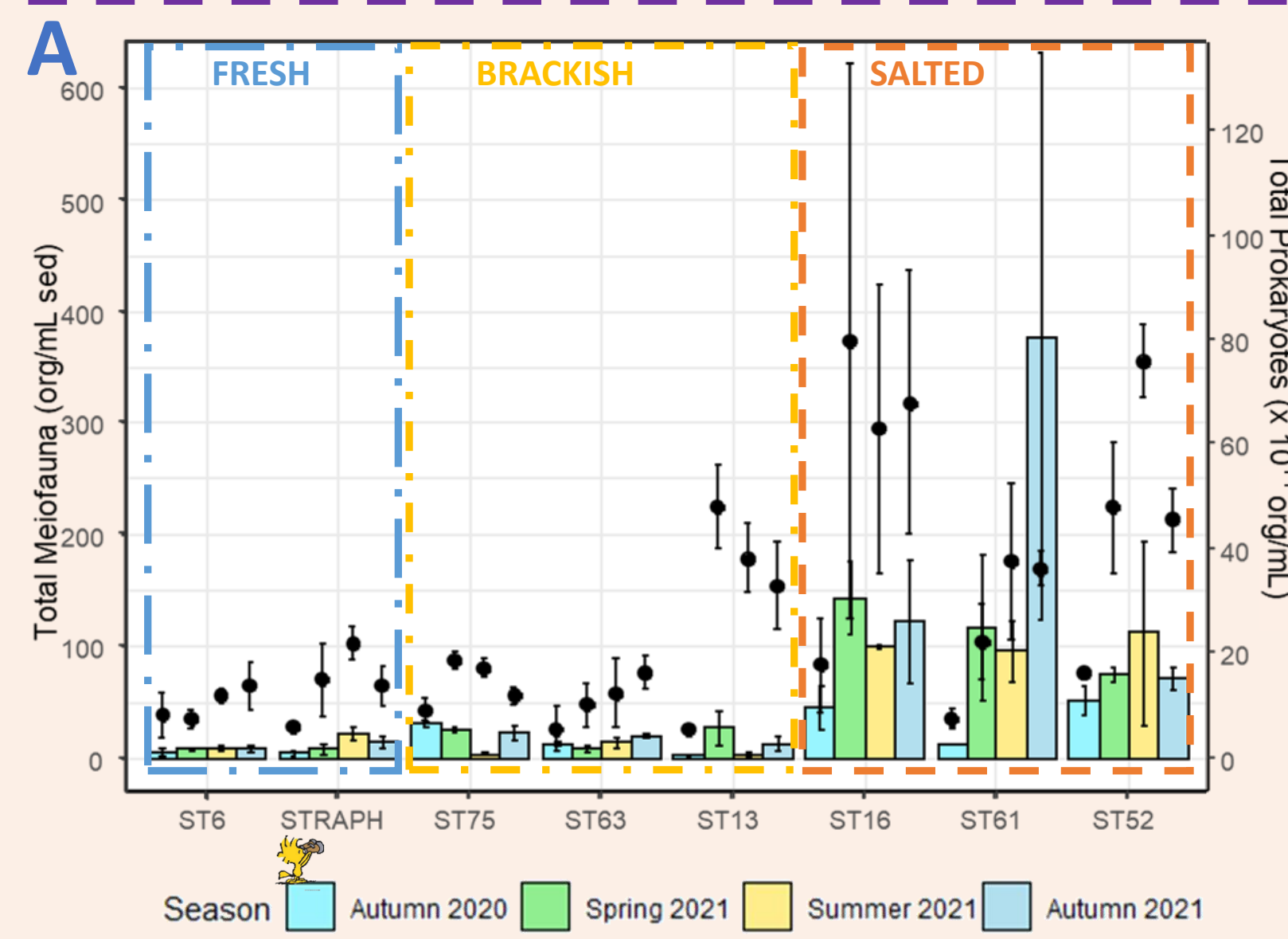


Fig 2: Meiofaunal (bars) and prokaryotic (dots) abundances (A) and meiofaunal composition (B) for all sites.

- Salted sites presented a higher meiofaunal abundance*** dominated by Nematodes.
- Fresh and brackish samples had lower meiofaunal abundance with higher proportion of copepods*, ostracods** and other organisms***.
- Prokaryotic abundance was high in all sites but higher in salted stations***.

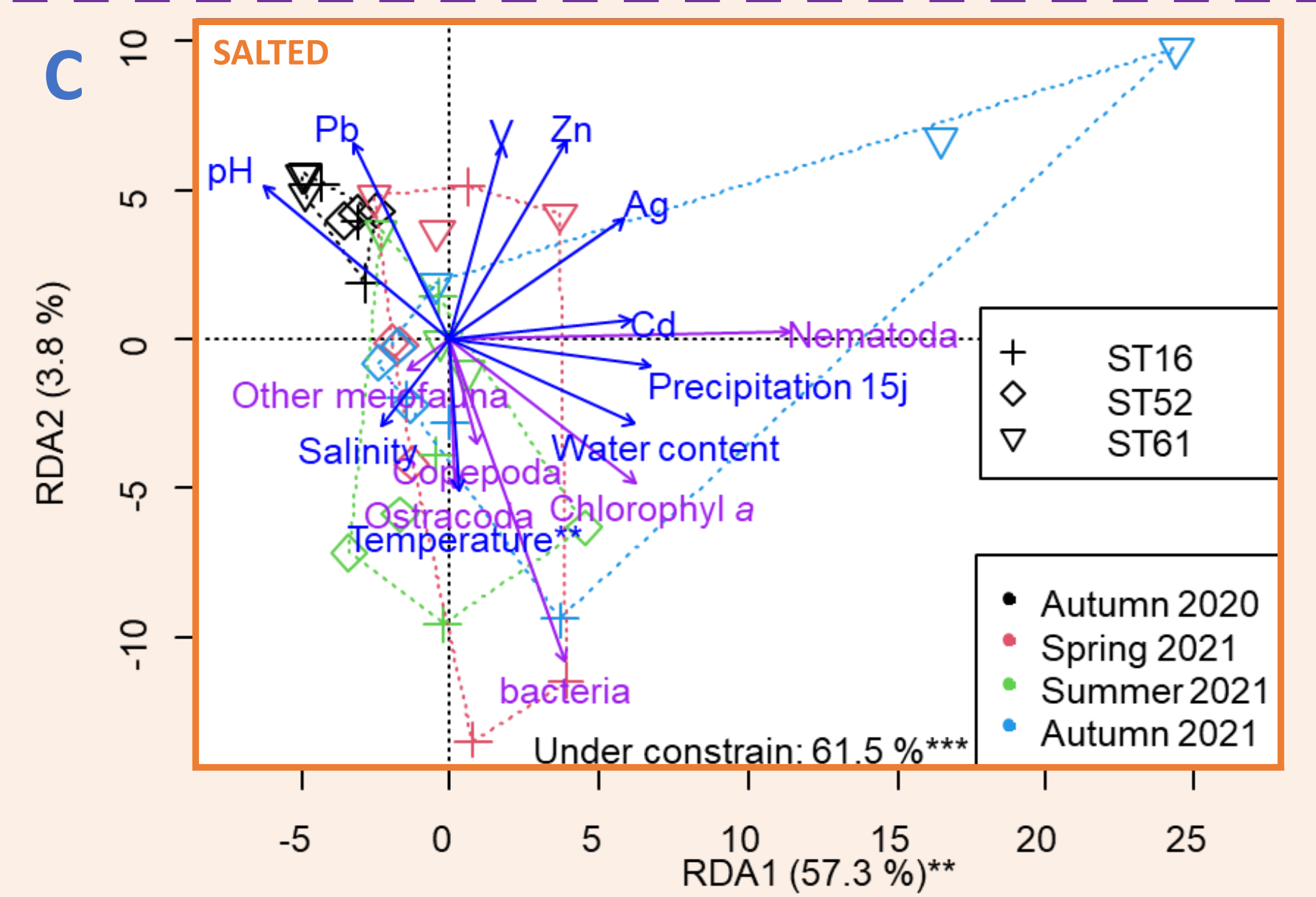
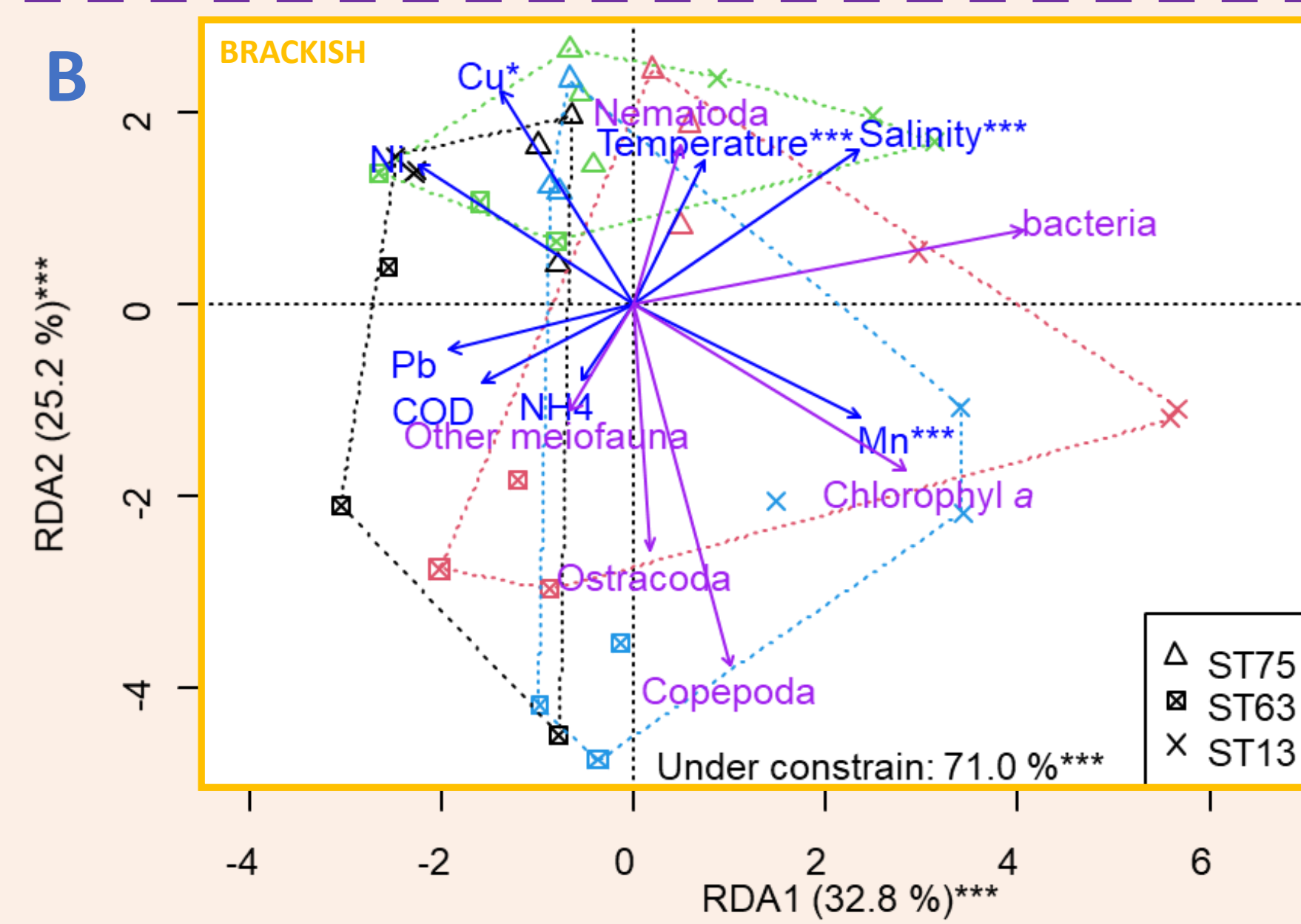
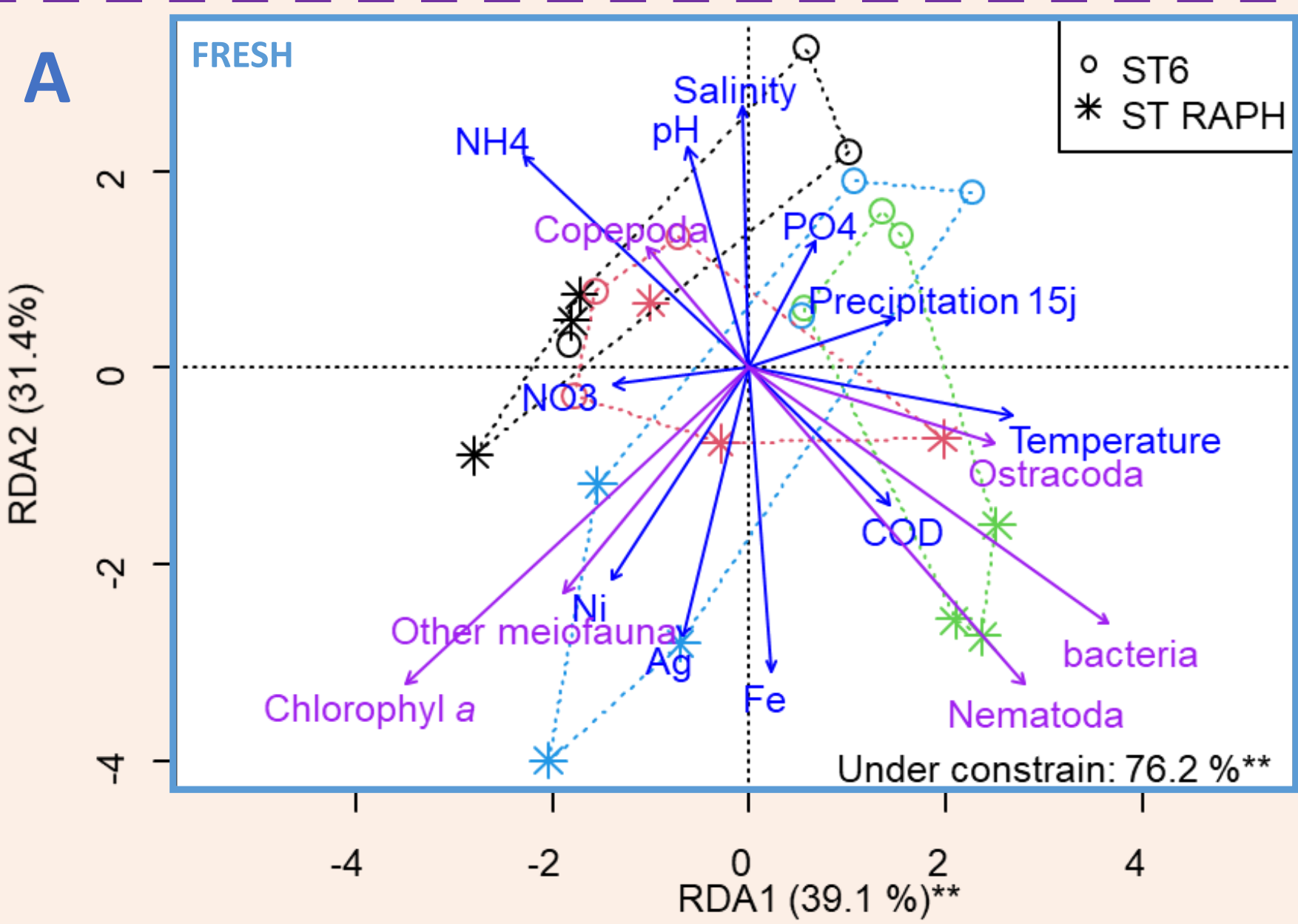


Fig 3: RDA analysing biotic parameters against abiotic factors was conducted separately for fresh (A), brackish (B) and salted (C) sites. Significativities were tested for the total model, axis and variable with ANOVA (***) < 0.001 ; ** < 0.01 ; * < 0.05 .

Fresh sites showed the highest seasonal effect. Prokaryotes were more abundant in seasons with higher DOC and temperature and lower NH_4^+ concentrations.

In brackish sites prokaryotic abundance decreased with salinity and for seasons with high level of Pb and NH_4^+ . Chlorophyll *a* was lower in sites with high metal concentrations.

The lowest seasonal effect was observed in salted sites. Prokaryotic and meiofaunal abundances were lower in samples with higher metal concentration.

CONCLUSION

- Salinity is the main driver of community variation depicting a clear separation of salted and fresh/brackish marshes with a more pronounced seasonal effect that can be observed in fresh sites.
- Organisms abundances suggest that prokaryotes could be used as good indicators of ecological status in all marsh types and meiofauna in salted marshes.
- Meiofauna, prokaryotes and chlorophyll *a* hinted a sensitivity to metals in brackish and salted sites.
- Environmental DNA analysis will be conducted to understand factors controlling community composition.
- All information gathered will be useful to define potential bioindicators evaluating ecological statuses.