# Evaluating the impact of scallop (*Argopecten purpuratus*) cultivation on the benthic infaunal community in Sechura Bay, Peru


**Meyer S. [1], Taylor M.H. [2], Aramayo Navarro V.H.[3], Kluger L.C.[2], Wolff M.[2]**

[1]: University of Bremen, Leobener Str. NW2, 28359 Bremen, Germany

[2]: Leibniz Center for Tropical Marine Ecology, Fahrenheitstraße 6, 28359 Bremen, Germany

[3]: Instituto del Mar del Perú, Esquina Gamarra y General Valle S/N Chucuito, Callao, Peru


## Introduction & Objectives

Sechura Bay (Fig. 1A) is the principal cultivation site for scallops (*Argopecten purpuratus*) within Peru. The livelihood of many people depends on the production and processing of this resource which can only be secured in the long run if operated sustainably. The impact of cultivation can be assessed by examining the benthic infaunal community structures and their level of disturbance, thereby providing indications of the state of the respective environment. In combination with abiotic features particular changes are then possible to observe and discuss.

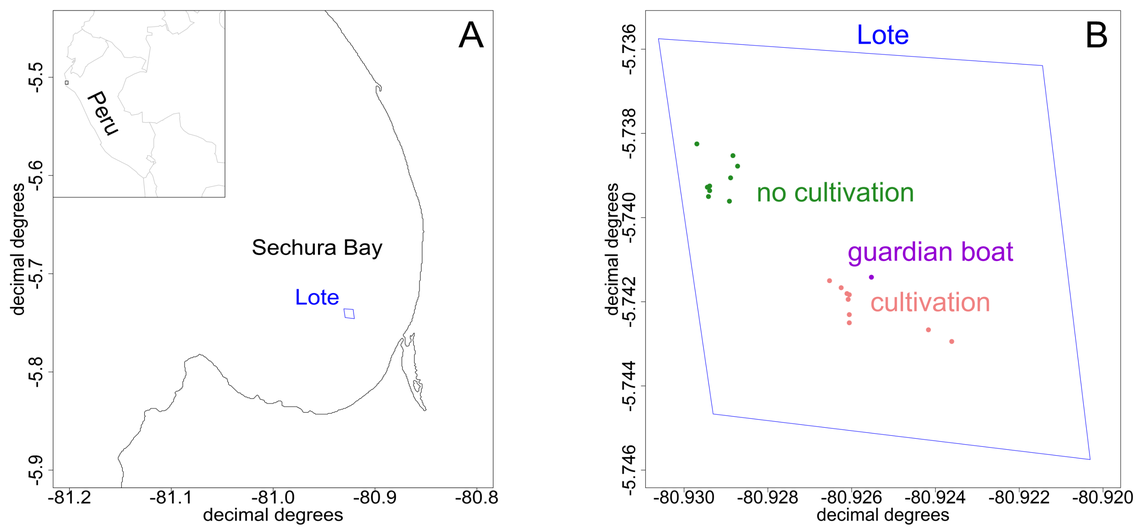


**Fig. 1:** Sechura Bay and the lot ("Lote") where the sampling took place (A). Detail of the lot displaying the location of the sampling plots (B).

## Methods

### Setting

| | |
|---|---|
| Sampling date | March 2014 |
| Depth | 10 m |
| Core sampling | PVC tubes |

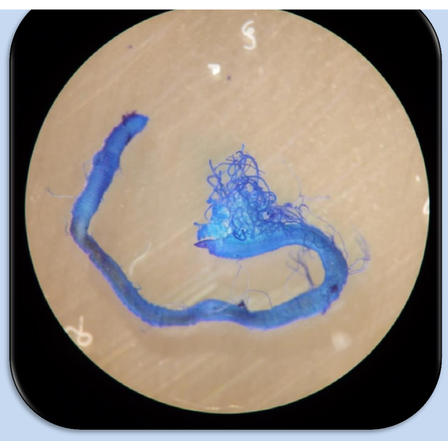

**Fig. 2:** *Tharyx sp.* stained with methylene blue

- comparison between sites with and without cultivation for the last ten years within one lot (Fig. 1A)
- 9 plots per site (Fig. 1B)

Within each plot [1m²]:

- 3 cores for infauna analysis (Fig. 2)
  → abundance, biomass
- 2 core for sediment analyses
  → grain size, organic matter, nitrogen, total inorganic carbon
- *A. purpuratus*
  → biomass, abundance

## Preliminary Results

| significant differences between the two sites | |
|---|---|
| *A. Purpuratus* (biomass, abundance) | **Yes** |
| Community Structure | **Yes** |
| Shannon Wiener Index H' (biodiversity) | **No** |

| Shannon Wiener Index H' | |
|---|---|
| Yes - Cultivation | 1.86 ± 0.35 |
| No - Cultivation | 1.69 ± 0.33 |

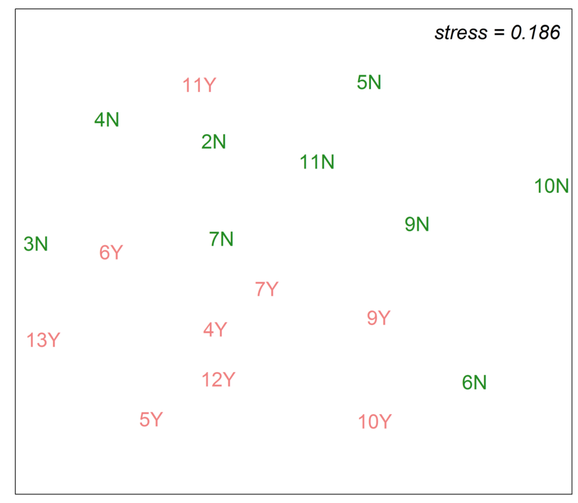


**Fig. 3:** nMDS plot of the sampling plots. Data were processed on species level. Transformation: fourth root. Distance Matrix: Bray-Curtis.

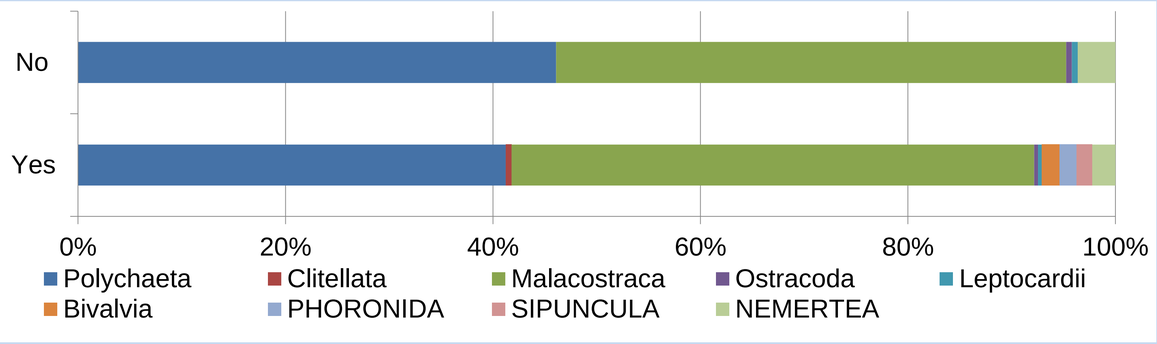


**Fig. 4:** Groups of organisms of cultured (Yes) and non-cultured (No) sites in percentage based on means of sampling plot data. Groups in capital letters represent phyla ,the others classes.

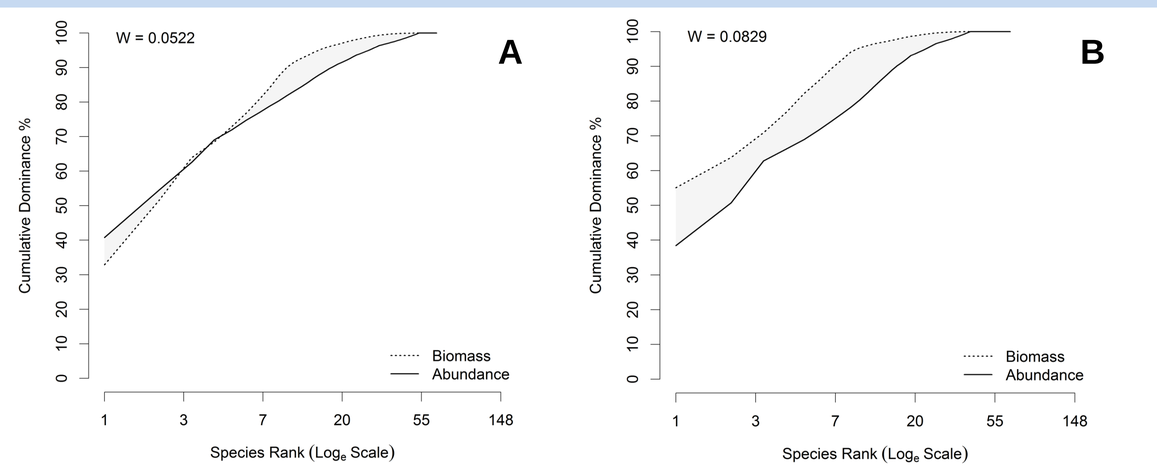


**Fig. 5:** *k* – dominance curves of cultured (A) and non-cultured (B) sites based on pooled data of sampling plots.

- cultured sites comprise more different groups of organisms (Fig. 4)
- no distinct grouping obvious via nMDS (Fig. 3) but analysis of similarity revealed significant difference between communities
- *k* – dominance curve indicates moderate disturbance for the cultured sites (Fig. 5A) and no disturbance for the non-cultured sites (Fig. 5B)

## Conclusion

no apparent effect of scallop cultivation based on diversity indices

**BUT**

community structures differ significantly and vary in their levels of disturbance between cultured and non-cultured sites

→ **Indicating slight impact of scallop cultivation based on benthic infaunal community**


## Acknowledgment

**Thanks to the "Bundesministerium für Bildung und Forschung" (BmBF) whose finanzing the projects of "Sustainability Analysis of Scallop Culture in Sechura Bay (Peru)" (SASCA) as well as to the "Programm zur Steigerung der Mobilität von deutschen Studierenden" (PROMOS) of the "Deutsche Akademischer Austauschdienst" (DAAD). Moreover, thanks to the Universidad Nacional Agraria La Molina (UNALM) and the Instituto del Mar del Perú (IMARPE) for the possibility to use their facilities. And a special thanks to the "Asociación de Pescadores Artesanales Beatita de Humay" for the cooperation.**