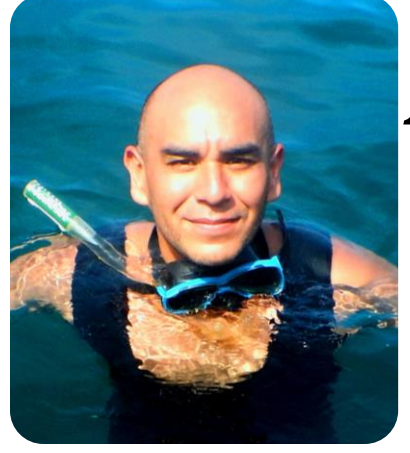


MARINE MACROBENTHIC COMMUNITIES ASSOCIATED TO THE PERUVIAN SCALLOP *ARGOPECTEN PURPURATUS* CULTURE (MACOPS): STRUCTURAL AND FUNCTIONAL DIVERSITY, FEEDING ECOLOGY AND CONTAMINANT EXPOSURE

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PhD PROJECT RESEARCH - AIM

The aim of **MACOPS** project is to evaluate the different **responses** of **macrobenthic communities** from the Sechura Bay and Illescas Reserved Zone – Piura Region (Peru) to **anthropogenic activities** and/or **natural phenomenon** (i.e. El Niño Southern Oscillation – ENSO).

Therefore, this research applies an **integrated approach** based on field data collected in Sechura Bay and front Illescas Reserved zone, specifically **macrobenthic communities, seston and sediments** using **stable isotopes** ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$), **fatty acids** and **metals** in two locations along the Sechura Bay, and one in front the Illescas Reserved Zone during the **pre and post-raining season** in the years **2016 (ENSO) – 2017 (post ENSO)**. As a result, this project will provide **first insights** into the integration of different variables for the **environmental quality assessment** of **Sechura Bay and Illescas Reserved Zone**, and its possible applicability in other aquatic ecosystems along the coast of Peru.

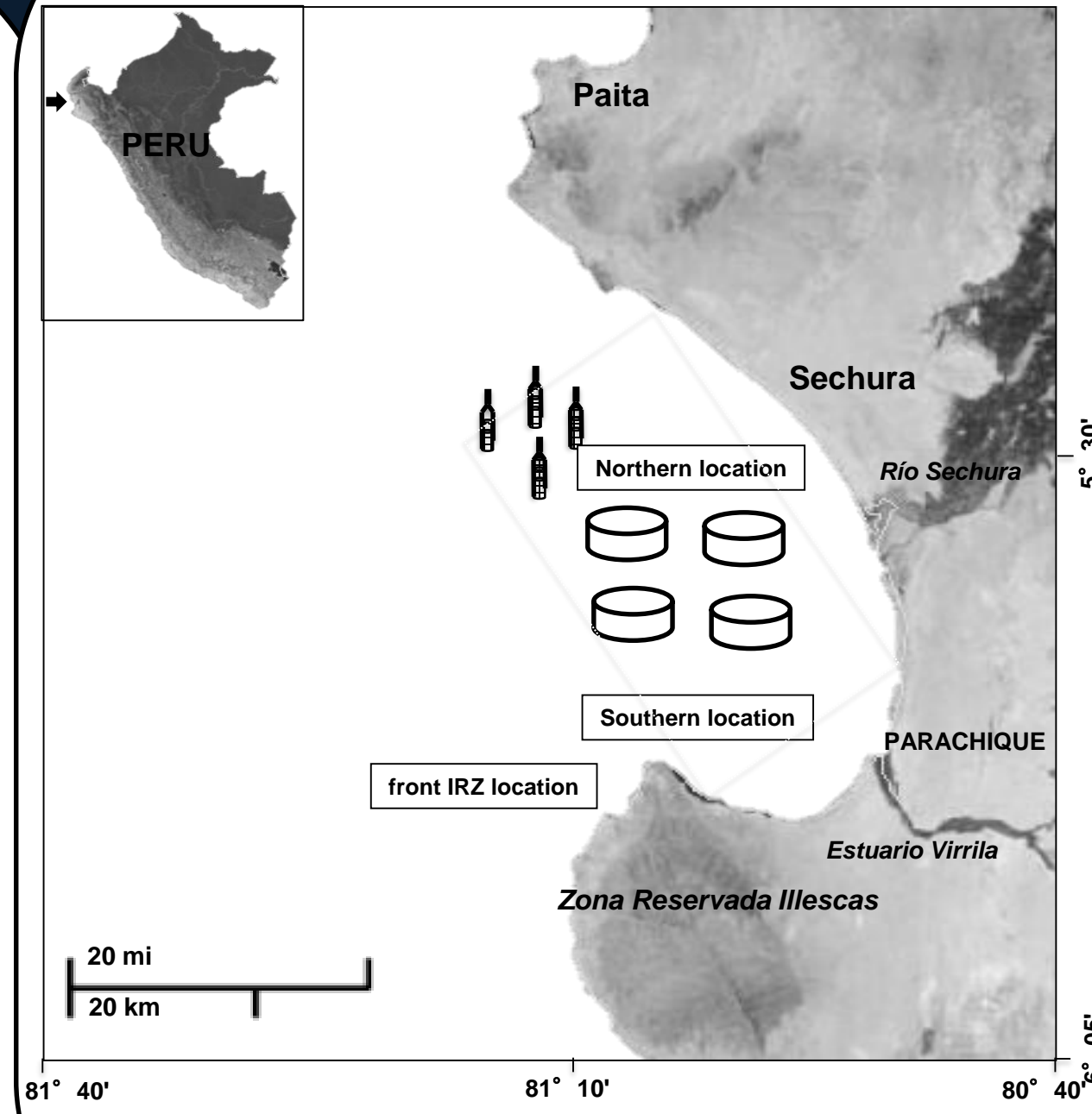


Fig. 1. Location of the experimental set up

MATERIALS AND METHODS

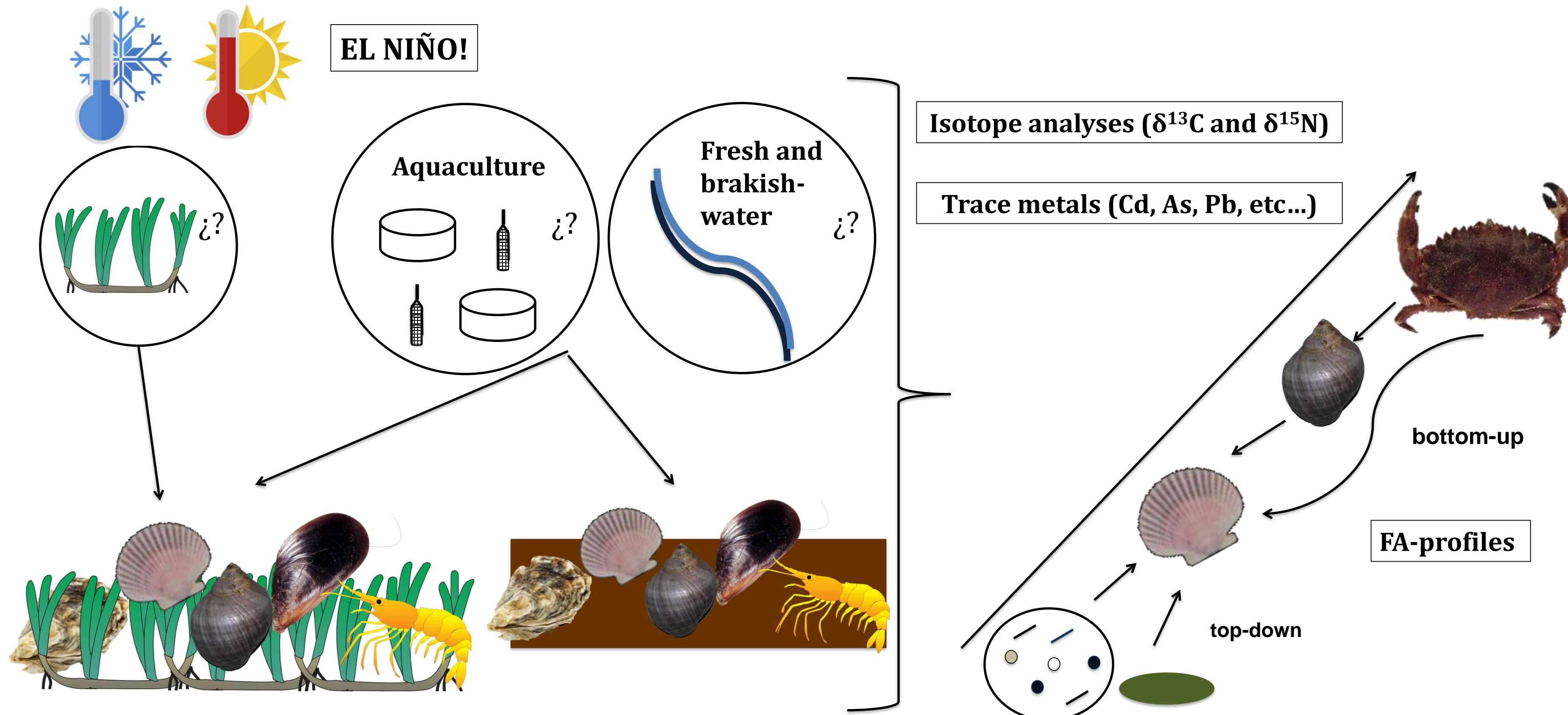


Fig 2. Experimental design



Fig 3. Seston trap installation and macrobenthos (infaunal) sampling

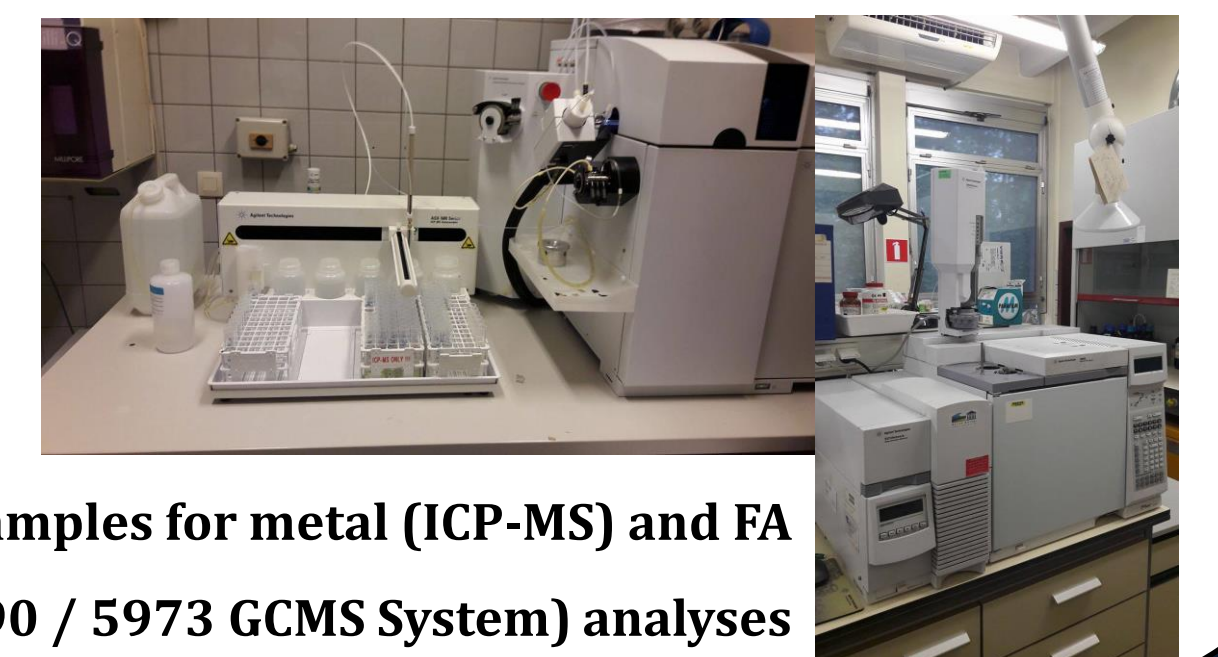


Fig 4. Samples for metal (ICP-MS) and FA (Agilent 6890 / 5973 GCMS System) analyses

PRELIMINARY RESULTS I

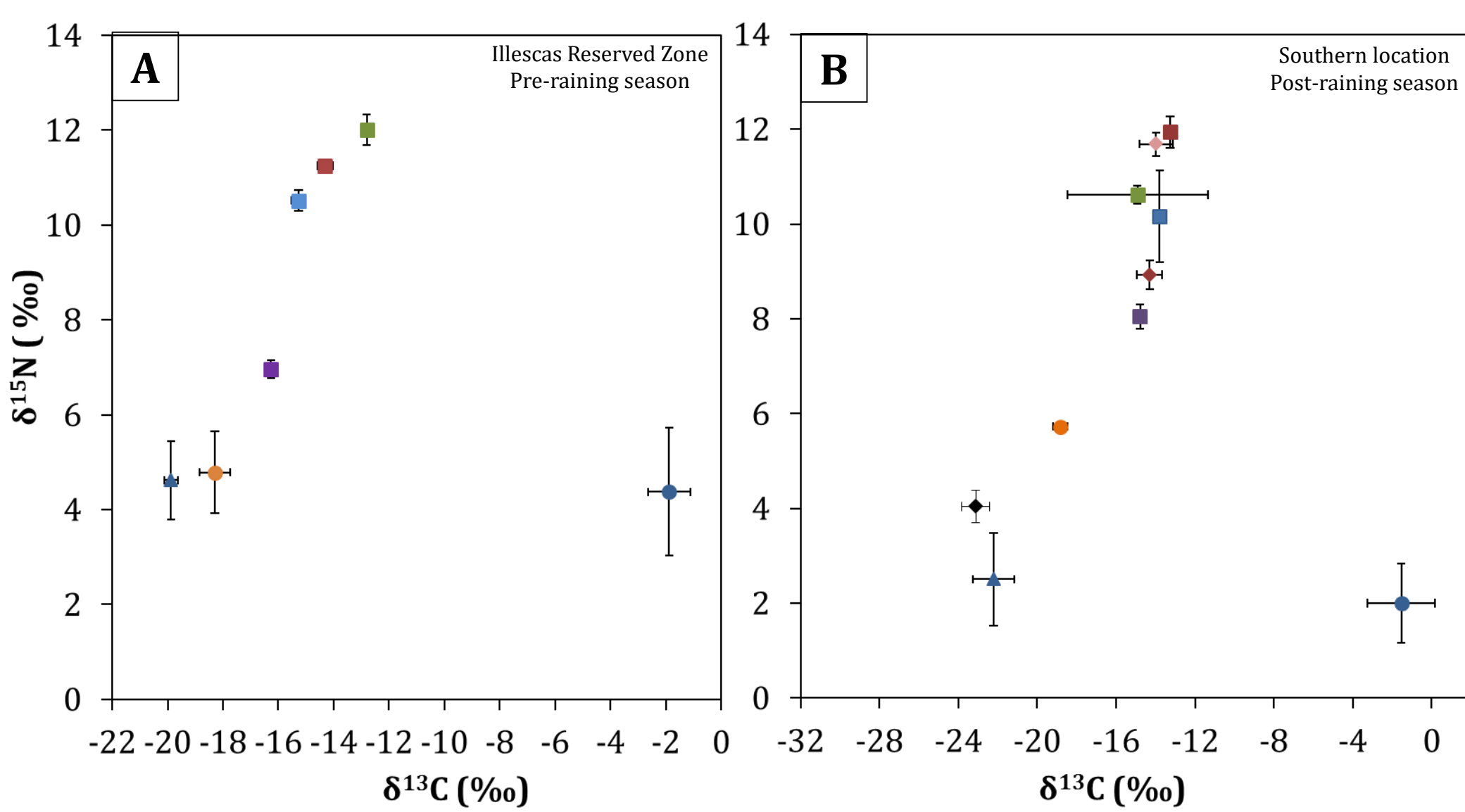


Fig 4. Stable isotope signature ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) for all samples during the (A) pre-raining season at front the Illescas Reserved Zone and during the (B) post-raining season at the southern location of Sechura Bay. Symbols: crabs ■ "*Romaleon polyodon*", ◆ "*Hepatus chilensis*", snails ■ "*Bursa ventricosa*", ◆ "*Cymatium sp.*", octopus ■ "*Octopus mimus*", scallop ■ "*Argopecten purpuratus*", ● seston, ◆ estuary input, ▲ POM and ● sediment.

The crabs *Romaleon polyodon* and *Hepatus chilensis* showed the highest trophic level with $\delta^{15}\text{N}$ values of 11.94 ‰ and 11.69 ‰ in the Southern location (Fig 4B). The lowest values were measured for the food sources (Fig 4A and 4B). The Peruvian scallop *Argopecten purpuratus* was more $\delta^{15}\text{N}$ -depleted (6.96 - 8.05 ‰) than its potential predators *H. chilensis*, *R. polyodon*, *Bursa ventricosa*, *Octopus mimus* and *Cymatium sp* (Fig 4A and 4B).

Mean $\delta^{13}\text{C}$ values for predators of *A. purpuratus* were between -12.25 and -15.26 ‰. Food sources showed high variations because the fresh and brackish-water input (i.e. sediments were -1.88 and -1.55 ‰, respectively in front Illescas Reserved Zone and Southern location) (Fig 4A and 4B).

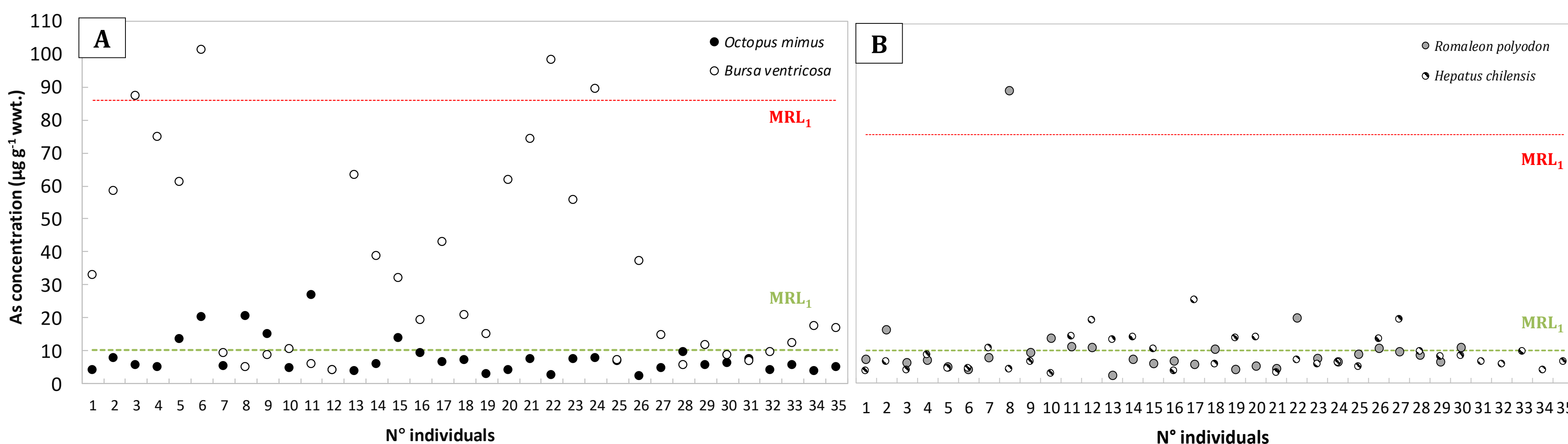


Fig 5. Arsenic concentrations ($\mu\text{g g}^{-1}$ wwt.) in muscle (A) of *O. mimus*, *B. ventricosa*, (B) *R. polyodon* and *H. chilensis* individuals compared to the maximum residue levels (MRL₁: FDA and MRL₂: CFS-HONG KONG) for human consumption.

Arsenic (As) in muscle of *O. mimus*, *B. ventricosa*, *R. polyodon*, and *H. chilensis* sometimes exceeded the MRLs. *B. ventricosa* and *R. polyodon* contained the highest As levels of 101.26 and 89.36 $\mu\text{g g}^{-1}$ wwt., respectively (see Fig 5A and 5B).

PRELIMINARY RESULTS II

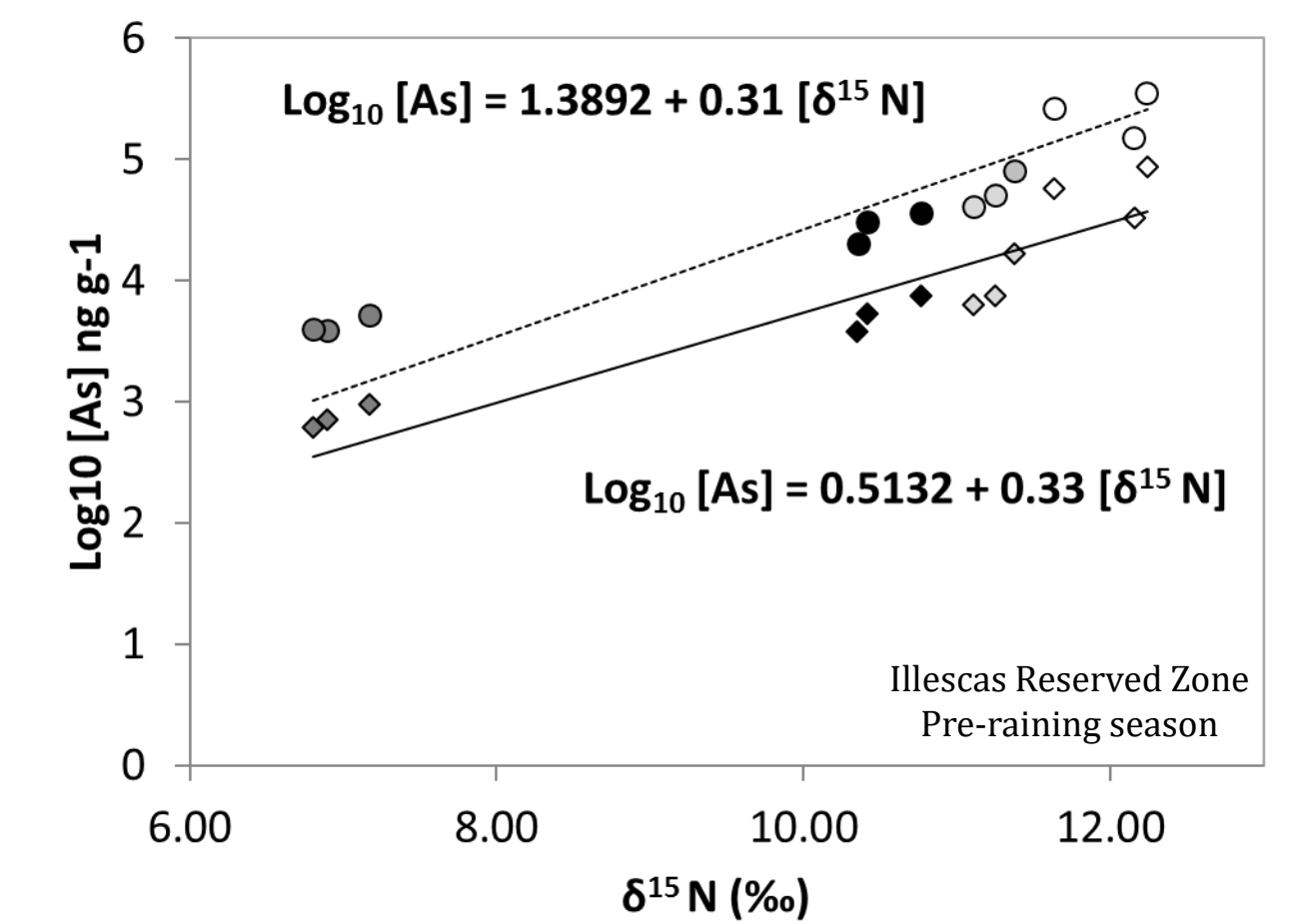


Fig 6. Relationship between $\delta^{15}\text{N}$ values and log-transformed concentrations of As in organisms from Illescas Reserved Zone (pre-raining season). Circles or diamonds white: *B.ventricosa*; light grey: *R. polyodon*; black; *O.mimus*; and dark grey: *A. purpuratus*. Dash line and circles are based in dwt. Solid line and diamonds are based in wwt.

Trophic magnification were present for As, indicating As accumulation along the food benthic web (Fig 6).

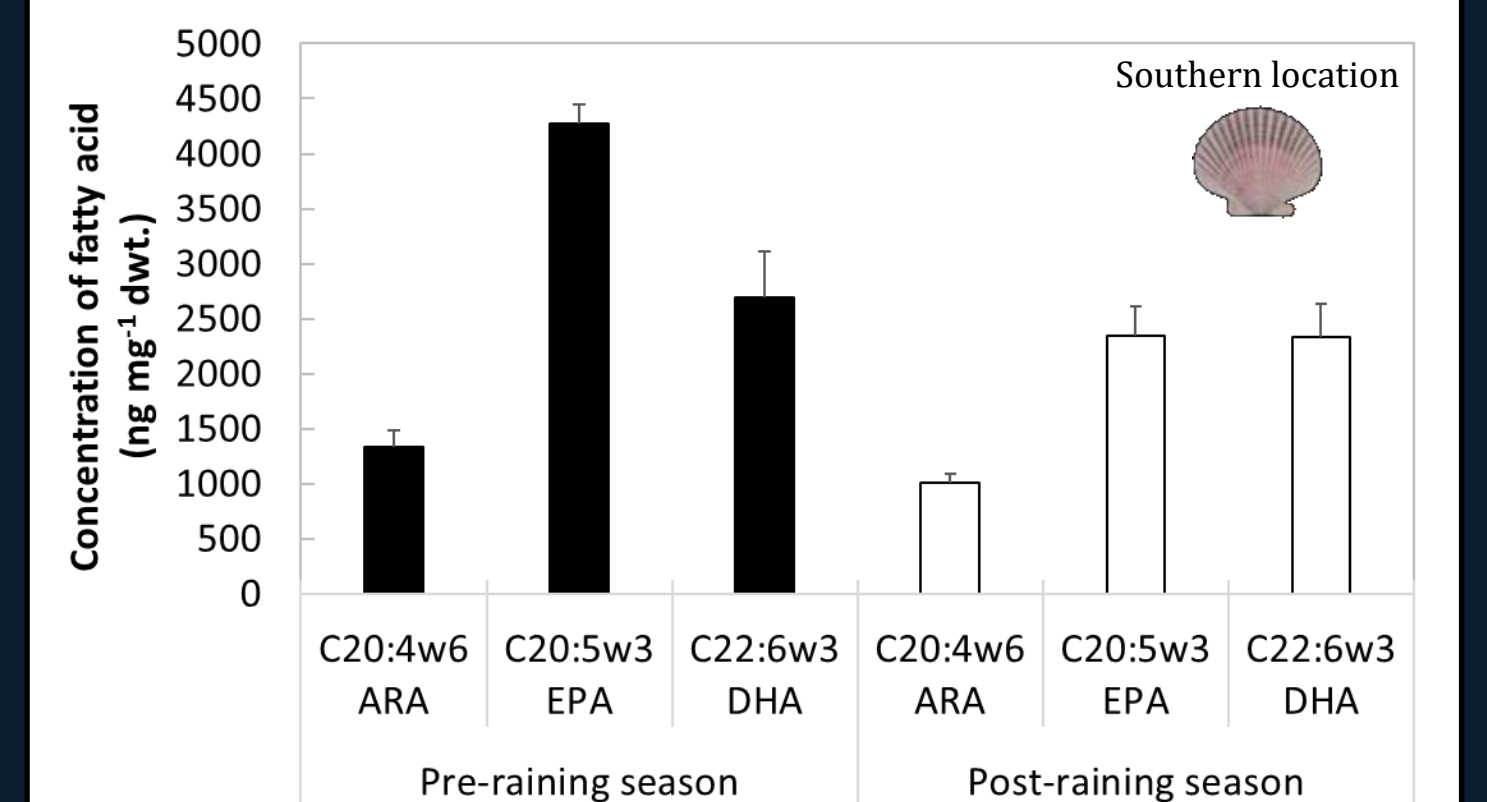


Fig 7. ARA, EPA and DHA concentrations (ng mg^{-1} dwt.) in *A purpuratus* from the Southern location, Sechura Bay.

ARA, EPA and DHA were found in relevant concentrations. Lower EPA and DHA levels were measured in *A. purpuratus* during the post-raining season in the Southern location (Fig 7).

ACKNOWLEDGMENTS

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