

Diversity of the reef fish community within and outside a fishing zone in the marine protected area of Balandra Bay (La Paz, Mexico)

H.MANIQUET^{1,2}, B.FREDERICH², D.OLIVIER¹

¹ Departamento Académico de Ciencias Marinas y Costeras, Universidad Autónoma de Baja California Sur, La Paz, México

² Laboratory of Evolutionary Ecology, ULiège, Allée du six Août 11, Liège, 4000, Belgium

Background :

The establishment of marine protected areas (MPAs) is the most widely used tool for protecting marine biodiversity. However, many of these areas have no active controls, leaving place for illegal fishing and thus failing to achieve their objectives. This illegal fishery can negatively impact the ecosystem by targeting some fish species which can have cascading trophic effects. In regions where governmental authorities do not have the means to conduct active controls, collaboration with local population is essential to maintain a degree of vigilance. For example, some eco-tourism organizations provide financial support for the establishment and maintenance of marine protected areas, while at the same time reducing fishing activities due to the presence of tourists.

Objectives :

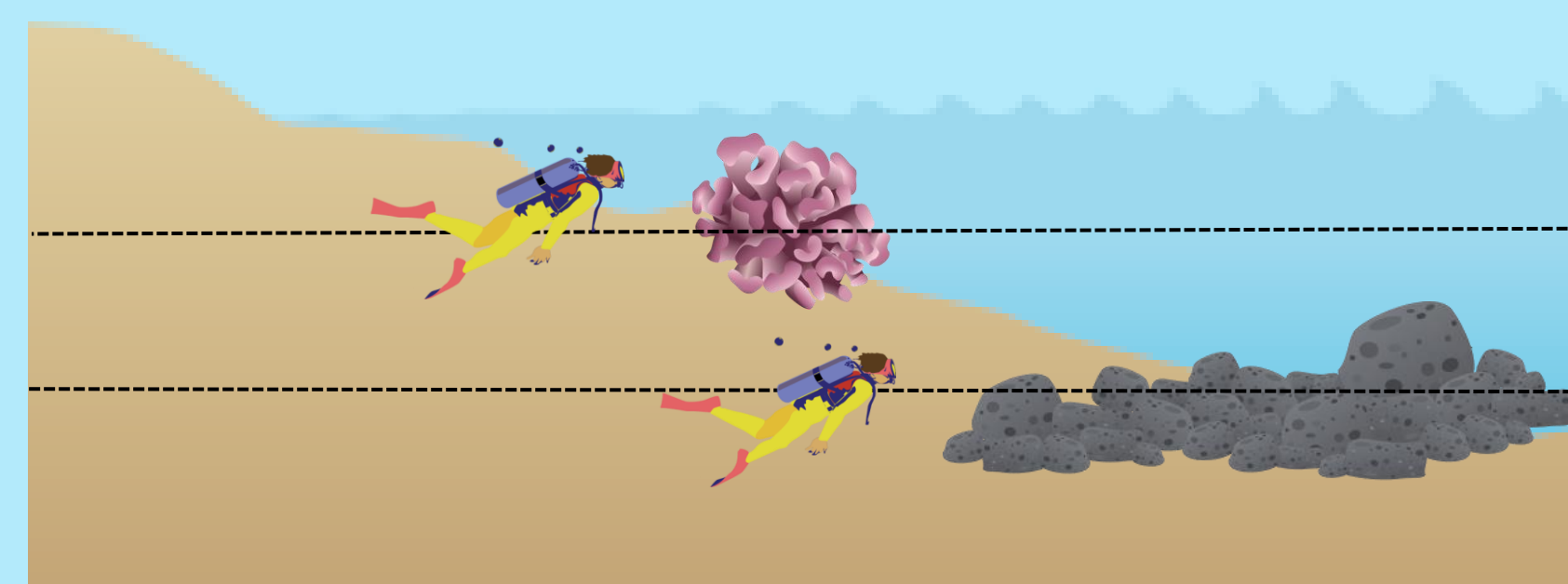
To assess the effect of the absence of fishing on reef fish communities, controlled by ecotourism in the MPA of Balandra in La Paz Bay, Mexico.

Methods :

Surveyed sites :



Monitoring activity :



Visual transect :

Number of species
Abundance
Size of individual

2 periods :
March-April & May-June

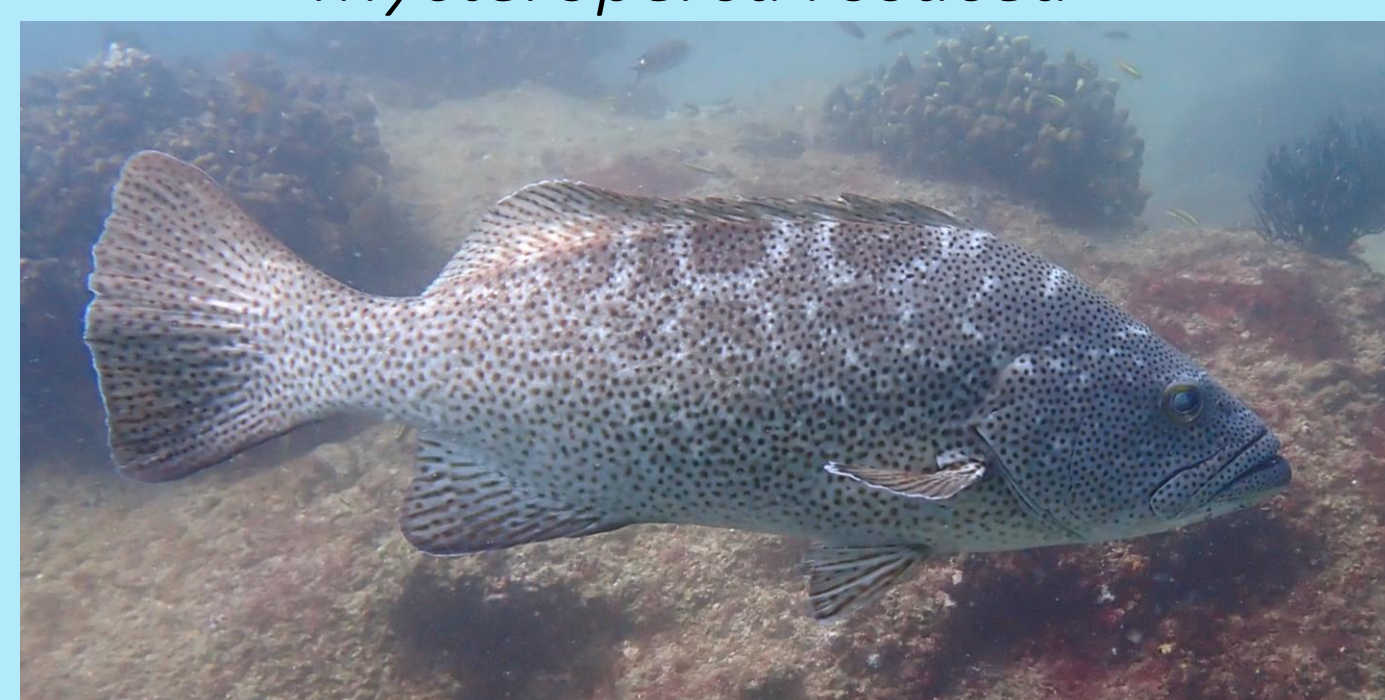
Statistical analyses :

Total biomass : Linear model

Biomass and density of fish targeted by fishery : Negative binomial model & ZINB model (Negative binomial distribution + Bernoulli distribution)

Mycteroperca rosacea

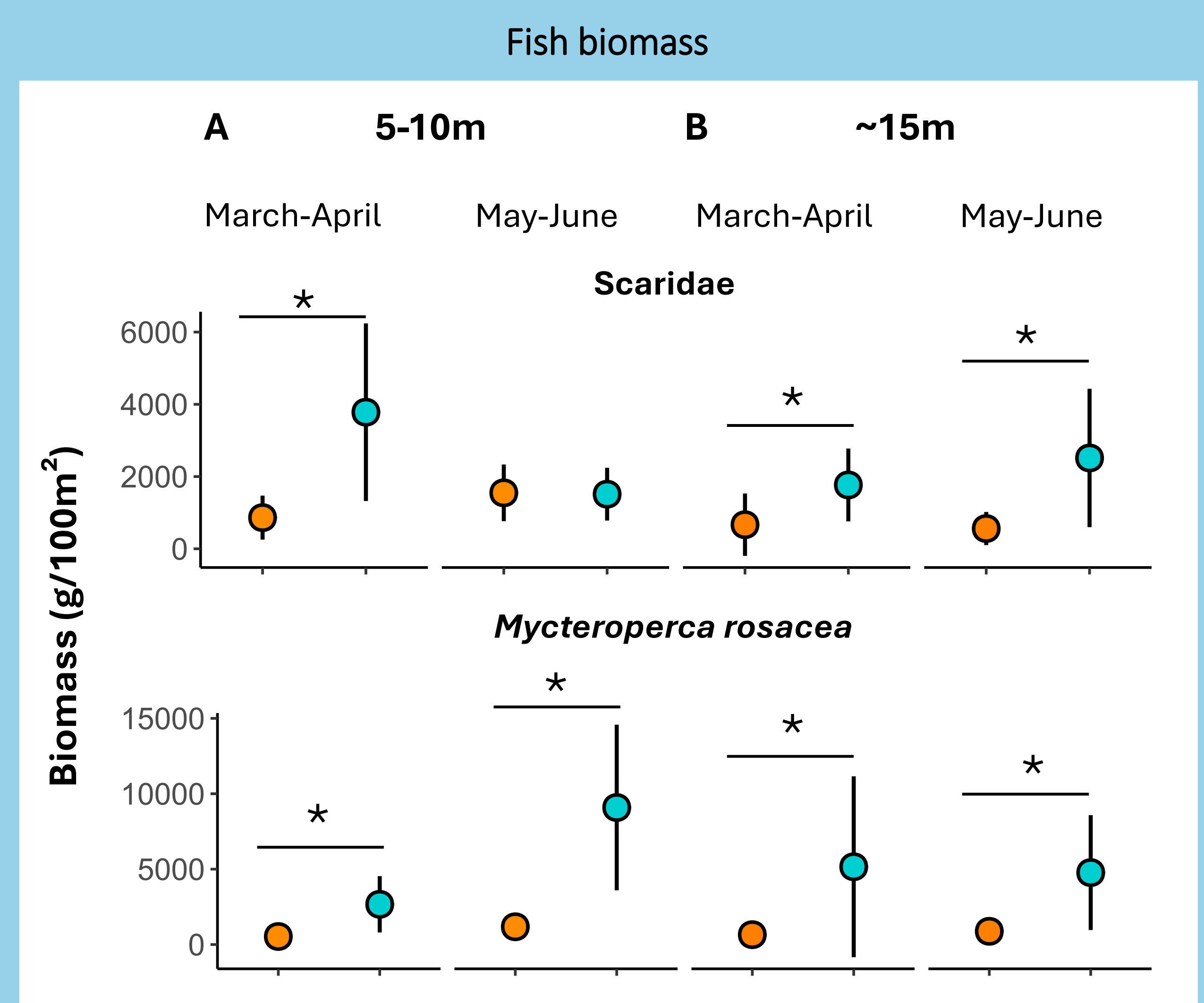
Scaridae



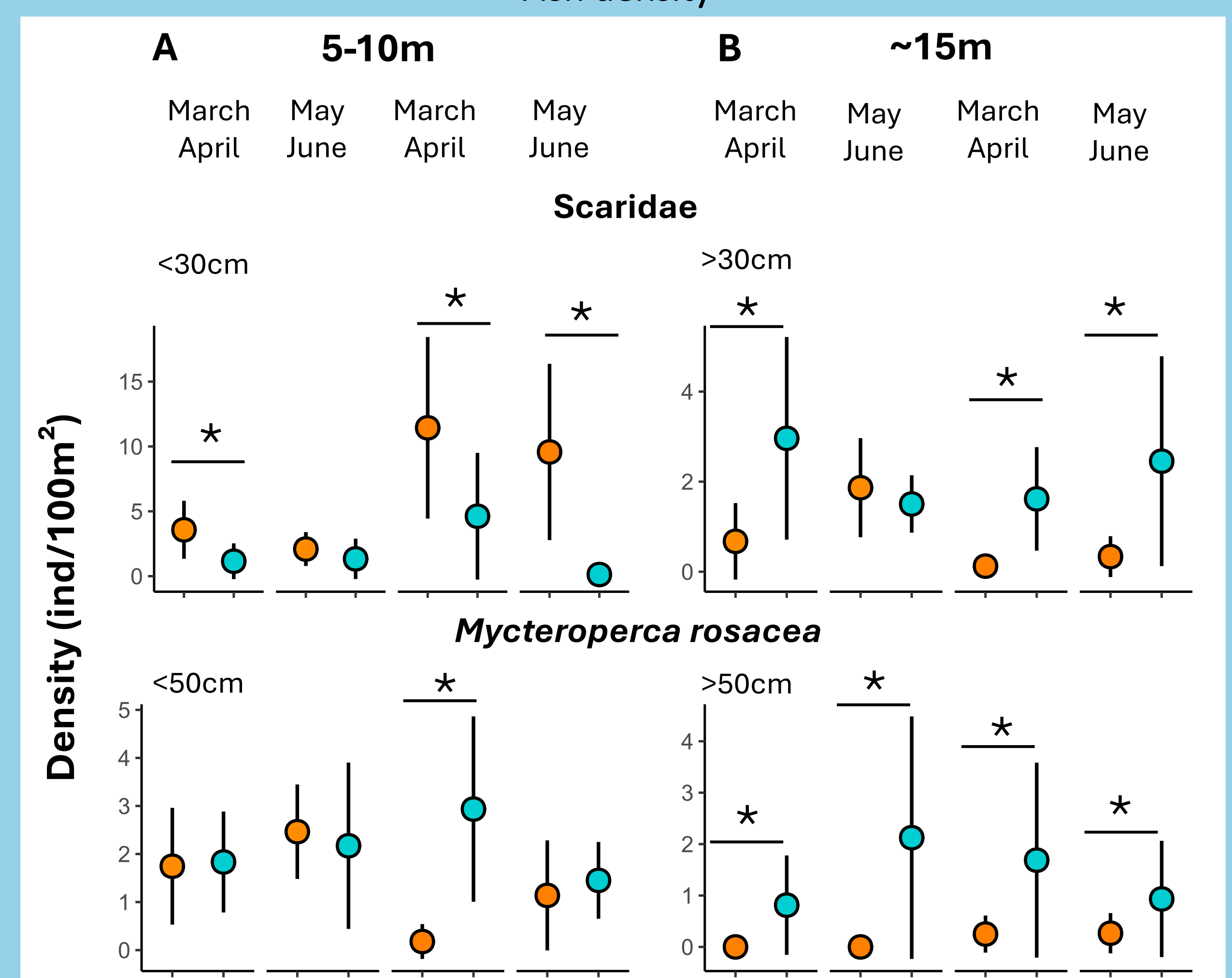
Results and Discussion :

Total biomass :

Significant difference between sites (p -value = 0.032) and between periods (p -value = 0.0067)



Fish density



The lower biomass and density of large piscivores and herbivores at La Gaviota may affect the reef ecosystem functioning. Indeed, the key roles of herbivory and bioerosion operated by Scaridae as well as the top-down control achieved by predatory Serranidae could be reduced at this site.

The reduction in the number of large individuals in La Gaviota could also have an impact on the reproduction of certain species.

Conclusion :

Analyses of the biomass and density of target species at La Gaviota and San Rafaelito sites highlight the impacts of artisanal and sport fishing.

Fishing not only reduces the biomass of species populations but also targets large individuals, thus reducing their density.

Citizen vigilance at San Rafaelito seems to ensure compliance with regulations and effectiveness of the protection measures implemented at this site.

