CHARACTERIZE THE BIOLOGICAL COMMUNITIES AND IDENTIFY THE ECOLOGICAL QUALITY OF THE ROCKY INTERTIDAL MACROFAUNAL ASSEMBLAGES AT SITES OF COMMUNITY IMPORTANCE (SICs) IN CANTABRIA

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INTRODUCTION

The *Red de Espacios Protegidos de Cantabria* (Protected Areas Network of Cantabria) focuses on terrestrial wildlife that live in habitats like dunes or cliffs, but there is a clear lack of species that live in the intertidal areas, especially in rocky areas.

The aim of this study is to describe the biological communities and to determine the environmental quality of sampling points in the intertidal areas belonging to Sites of Community Importance (SCIs) at Cantabria.

METHODOLOGY

Sample collection was performed using a quantitative sampling. The method consisted of taking four samples of 25 x 25 cm², two replicates in the middle level (*Corallina elongata*) and two in the lower level (*Bifurcaria bifurcata*). Sorting of the samples and taxonomical identification of the species found was undertaken in the laboratory.

To describe the structure of the benthic communities, abundance and biomass of each site and intertidal level were calculated. As well, the Shannon-Wiener diversity index (H') and the species richness (S), in both biomass (H'b) and number (H'n) were used.

To establish the environmental quality of the study area the CFR index was used. CFR index has proved to be an effective tool for the assessment of the ecological quality of coastal rocky communities, based on the analysis of macroalgae assemblages.

The quality of the rocky benthos assemblages for a single station is calculated as the arithmetic sum of the specific scores for each indicator at this site The Richness value (R) evaluates the number of different "characteristic macroalgae" populations that are present with a significant coverage (ca. > 1%). Moreover, the Cover score (C) assesses the relative extent of the whole sampling unit that is occupied by those assemblages, considered all together. The third indicator quantifies the abundance of Opportunistic species (O) in relation to the total vegetated surface, as one of the first symptoms of several anthropogenic disturbances, mainly related to nutrient enrichment. Finally, assignment of quality status for each station was established according to the five classes proposed by the Water Framework Directive, following the boundaries indicated in Table 1.

CFR = EQR	STATUS
0.8 -1	High
0.6 - 0.8	Good
0.4 - 0.6	Moderate
0.2 - 0.4	Poor
0 - 0.2	Bad

Table 1. EQR and Quality status assignment

Location

The study was carried out in 10 sites of the rocky intertidal area at Sites of Community Importance (SCIs) of Cantabria (Spain). See map.

Sampling sites	SICs
Pechón (PE), Prellezo (PRE), Liñera (LI) y Oyambre (OY)	Rías occidentales y duna de Oyambre
Robayera (RO)	Dunas de Liencres y estuario del Pas
Loredo (LOR)	Dunas del Puntal y estuario del Miera
Galizano (GAL) y Quintres (QUI)	Costa Central y ría de Ajo
Quejo (QUE) y Brusco (BR)	Marismas de Santoña, Victoria y Joyel

RESULTS AND DISCUSSION

Macroalgae communities

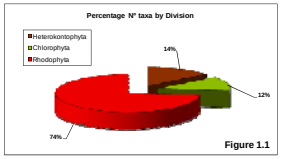


Figure 1.1

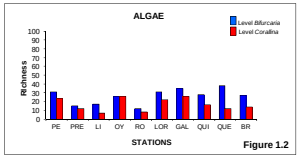


Figure 1.2

Algal communities were represented by 76 taxa, belonging to Rhodophyta division, Heterokontophyta and Chlorophyta. The division with the highest proportion of taxa was the red algae (Figure 1.1).

In general, the highest species richness was observed in the lower level. In Quejo and Galizano stations in the *Bifurcaria* level, and in Oyambre and Galizano stations in the *Corallina* level. (Figure1.2).

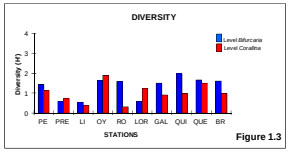


Figure 1.3

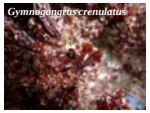
Diversity was also higher for the lower level as a result, in part, of the greater number of species. Only three stations (Loredo, Oyambre y Prellezo) showed higher values in the middle level because of the more uniform distribution of the biomass (Figure 1.3).

We must emphasize the minimum diversity of algae in the lowest level of Liñera and the middle level of Robayera, by the dominance of *Bifurcaria bifurcata* and *Corallina elongata* respectively.

CFR VALUES

CÓDE	AREA	CFR = EQR	STATUS
PE	PECHÓN	0.62	GOOD
PRE	PRELLEZO	0.74	GOOD
LI	LIÑERA	0.50	MODERATE
OY	OYAMBRE	0.81	HIGH
RO	ROBAYERA	0.54	MODERATE
LOR	LOREDO	0.53	MODERATE
GAL	GALIZANO	0.81	HIGH
QUI	QUINTRES	0.83	HIGH
QUE	QUEJO	0.64	GOOD
BR	BRUSCO	0.85	HIGH

Species included in the List of Wildlife Special Protection Regime (RD 139/2011, February 4).



Macrofauna communities

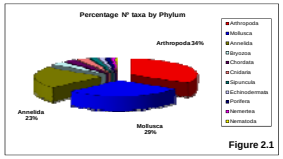


Figure 2.1

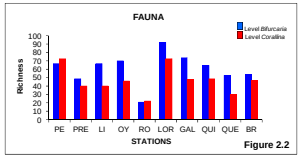


Figure 2.2

Regarding to the macrofauna, 240 taxa were recorded. The main groups were Arthropoda, Mollusca and Annelida. The most important phylum was Arthropoda (Figure 2.1).

The highest richness was obtained in Loredo for both levels, and in the middle level of Pechón. In general, greater richness were found in the eastern stations, althoug Pechón had high values for both levels, and Oyambre and Liñera showed high values in *Bifurcaria* level (Figure 2.2)

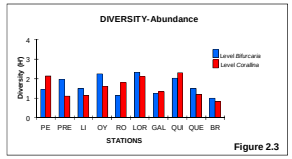


Figure 2.3

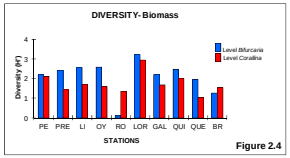


Figure 2.4

Diversity in terms of abundance was higher in the lower level of Oyambre, Loredo and Quintres because of the higher richness and the more uniform abundance distribution. The maximum for the middle level was observed in Quintres, with a not very high richness and without a clear dominance. The lowest value of diversity was found in Brusco because the dominance of *Mytilaster minimus* (Figure 2.3)

Diversity in terms of biomass was higher in Loredo, coinciding with maximum uniformity of species weights and the higher richness. The minimun value was observed in the lower level of Robayera due to the dominance of *Mytilus galloprovincialis* (Figure 2.4).

CONCLUSIONS

•The most common species were the red algae and arthropods. In all stations were found the following species of algae: *Corallina elongata*, *Lithophyllum incrustans* and *Ulva* spp. As well as the species of invertebrates *Pirimela denticulada*, *Hyale stebbingi*, *Tanais dulongii*, *Rissoa* spp, *Bittium reticulatum*, *Musculus costulatus*, *Mytilaster minimus*, *Mytilus galloprovincialis* y *Lasaea adansoni*.

•There were found four species included in the List of Wildlife Special Protection Regime (RD 139/2011, February 4). Two invertebrates, *Nucella lapillus* and *Patella ulissiponensis*, and two algae *Lythophyllum byssoides* (called in this work as *Lythophyllum tortuosum*), and *Gymnogongrus crenulatus*, although the latter are referred to the Mediterranean populations.

•In general, the CFR index determined a good ecological status, except in Liñera, Robayera y Loredo, which were classified as a moderate status.

GOBIERNO DE CANTABRIA
CONSEJERÍA DE GANADERÍA, PESCA Y DESARROLLO RURAL

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