A new method for assessing the underwater seascape for marine tourism management in Marine Protected Areas

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There has been an increase in the number of non-extractive uses linked to nature tourism in Marine Protected Areas (MPAs). In fact, MPAs play an important role in renewing the image of touristic sites and in the management and promotion of new leisure activities like snorkeling. Along with SCUBA diving, snorkeling is the most important diving activity in the world and a common first step to approach the marine environment. Among its benefits, snorkeling is simple, cheap, and accessible to a wide range of population. In addition, its low ecological impact makes snorkeling an interesting activity for MPAs. However, unlike terrestrial landscapes, there is no standard methodology to assess the recreational attributes of submerged seascapes.

DESIGNING A NEW METHOD: INDICATORS AND INDEX

	CONCEPTS		PERCEPTIBLE SEASCAPES ELEMENTS (PSE)	CATEGORIES	CONVERSION VALUES			
					0	2	4	6
1.	Disturbance	1.1.	Alien species					
		1.1.1	Presence/Absence	YES/NOT		YES	NOT	
		1.1.2	Introduced/Invasive	Introduced/Invasive [3]	INT/INV	INV	INT	
2.	Human activity traces	2.1.	Cultural practices and socioeconomic traces	YES/NOT		YES		NOT
		2.2.	Other traces	YES/NOT	YES			NOT
3.	Elements diversity	3.1.	Species richness	Value	<10	10-20	20-30	>30
		3.2.	Visual units diversity (biological formations and substrata)	Simpson index estimated for the various substrata and biological formations	0-0,25	0,25-0,50	0,50-0,75	0,75-1
4.	Visibility	4.1.	Depth average	0-15 m	>15	10-15m	4-9m	0-3m
		4.2.	Transparency/Visibility	1. 0- >70 m	0-5	5-20	20-40	>40
5.	Interesting Ecological, Biological and Geological elements	5.1.	Interesting or attractive species (Octopus, anemones…)					
		5.1.1	Presence/Absence	YES/NOT	NOT			YES
		5.1.2	Nº attractive species	Value	0	5	5<x<10	>10
		5.2.	Attractive Biological formations (Kelp beds Laminaria/Saccorhiza, anemones field…)					
		5.2.1	Presence/Absence	YES/NOT	NOT			YES
		5.2.2	Nº Attractive Biological formations	Value	0	1	1<x<3	>3
		5.3.	Presence-Absence geological formations (caves…)	YES/NOT		NO		SI
6.	Naturalness	6.1.	Presence/Absence anthropogenic constructions	YES/NOT	YES			NOT
7.	Seasonality	7.1.	Seasonality					
		7.1.1	Presence/Absence	YES/NOT		YES	NOT	
		7.1.2	Nº seasonal species	Value	X>5	5≤X≤3	2≤X≤0	0
8.	History/Culture	8.1.	Presence/Absence Historic/cultural elements (sunk galleons, cemeteries…)	YES/NOT	NOT			YES

POTENTIAL OBSERVATION INDEX (POI)	INDEX	ATTRIBUTES
Excellent	76,7-102	The area has the best landscape features for enjoying the seabed and its biodiversity through snorkeling. Snorkelers can enjoy a view of a nearly pristine seabed.
Very good	52-76,6	The area has a diversity of a scenic values that can be considered as good indicators of the seabed and is values. Snorkelers can get a fairly accurate picture of marine values.
Good	25,6-51	The area includes scenic values that can be of interest for seabed perception but it also has various shortcomings that are far from an ideal seabed for snorkeling. Snorkelers can still get a rough view of the marine values.
Acceptable	8-25,5	Area with very poor landscape characteristics that does not properly show the seabed and its biodiversity. Snorkelers will get an unsuitable view of the marine values. Nonetheless, it may sill contain some interesting components that could be attractive to certain users.

APPLYING THE NEW METHOD TO ISLAS ATLANTICAS NATIONAL PARK
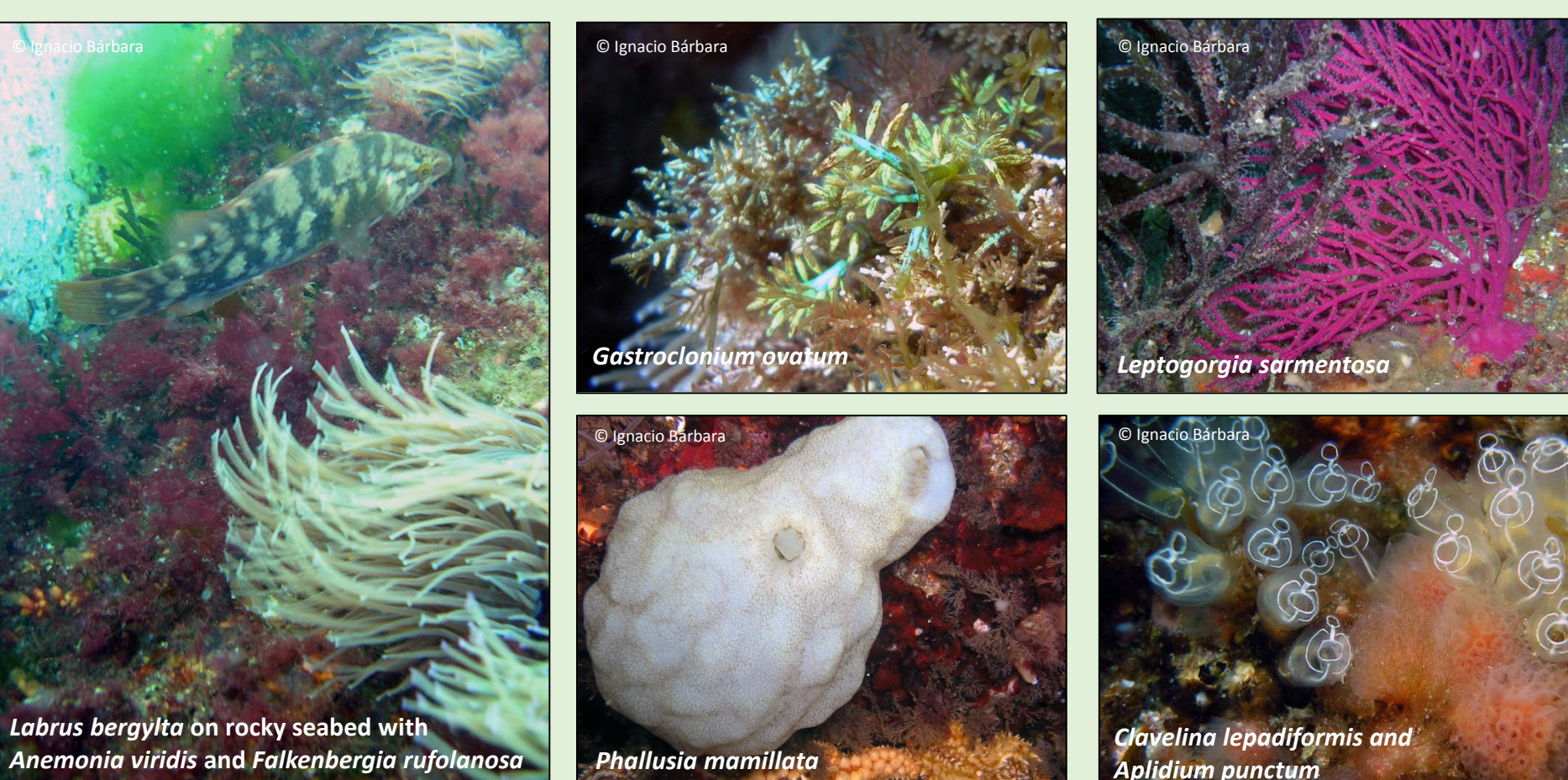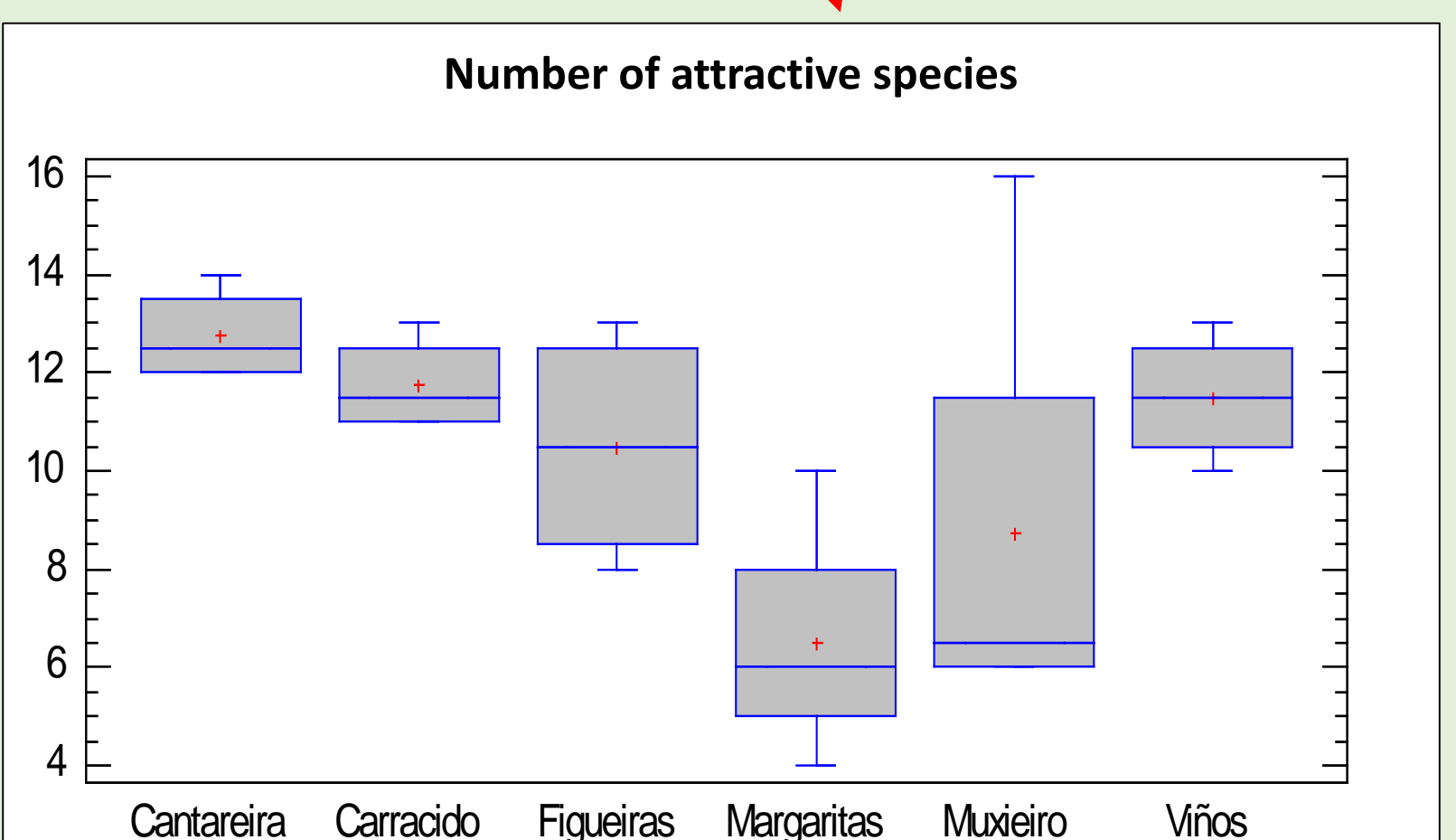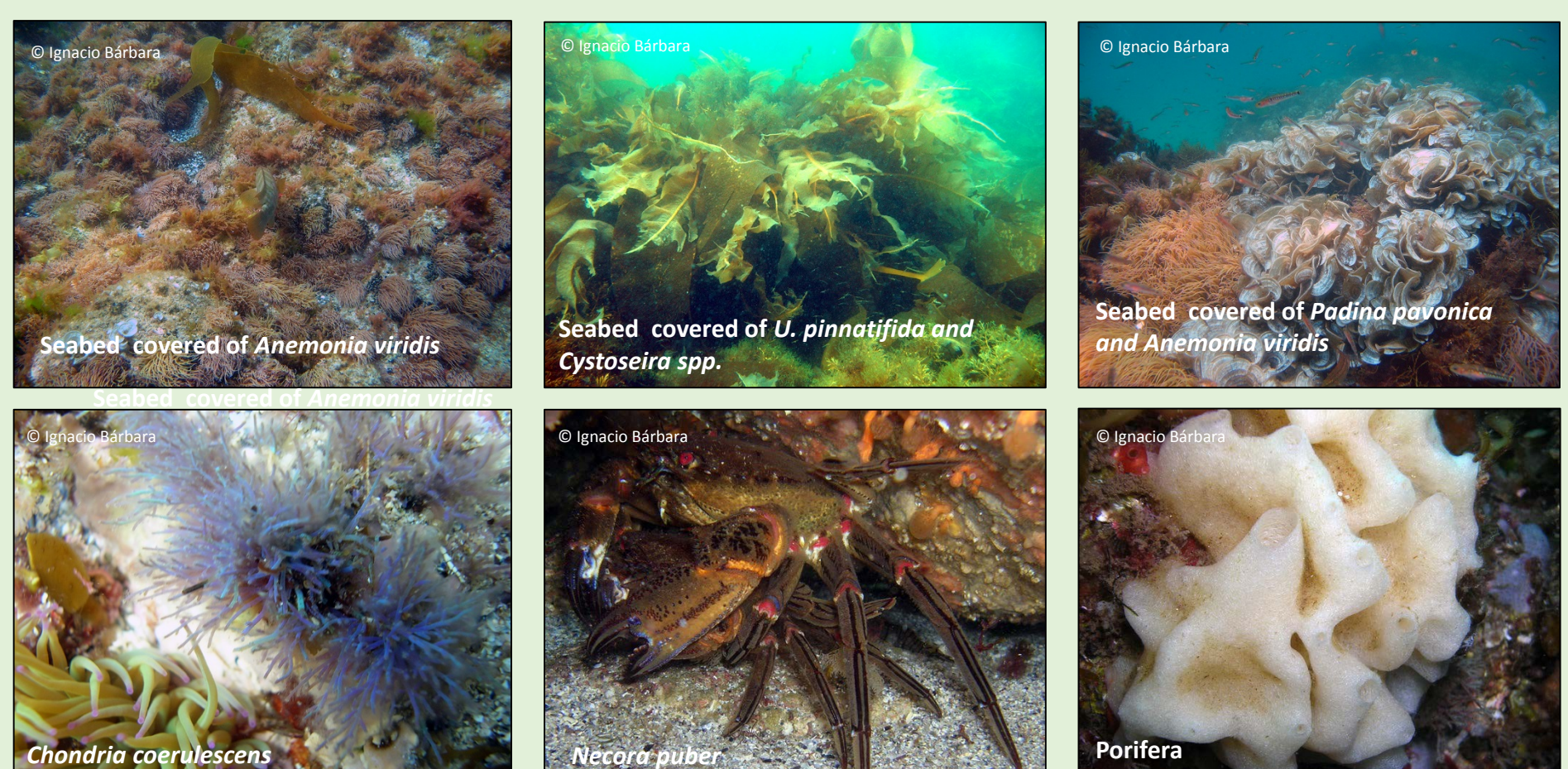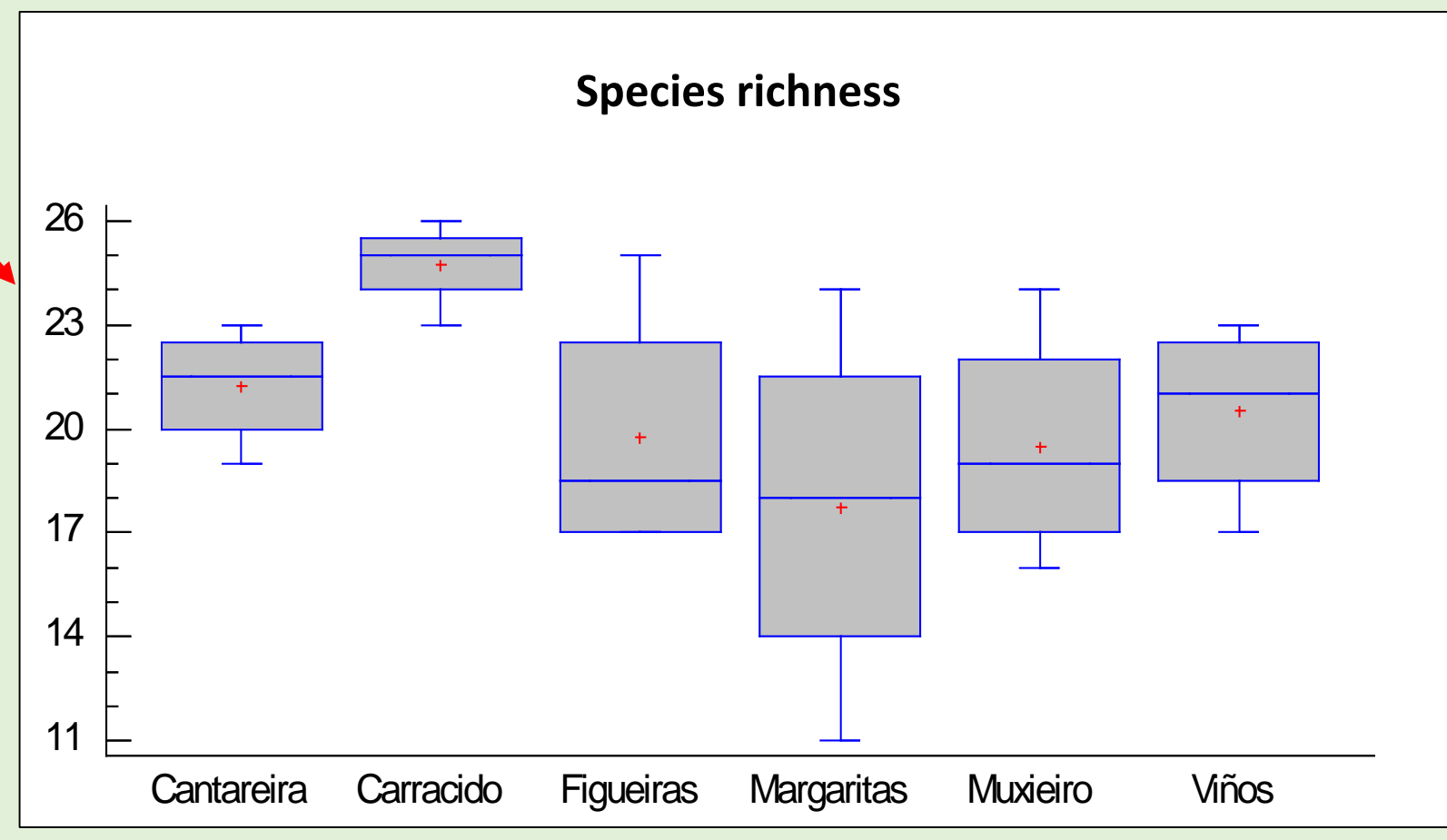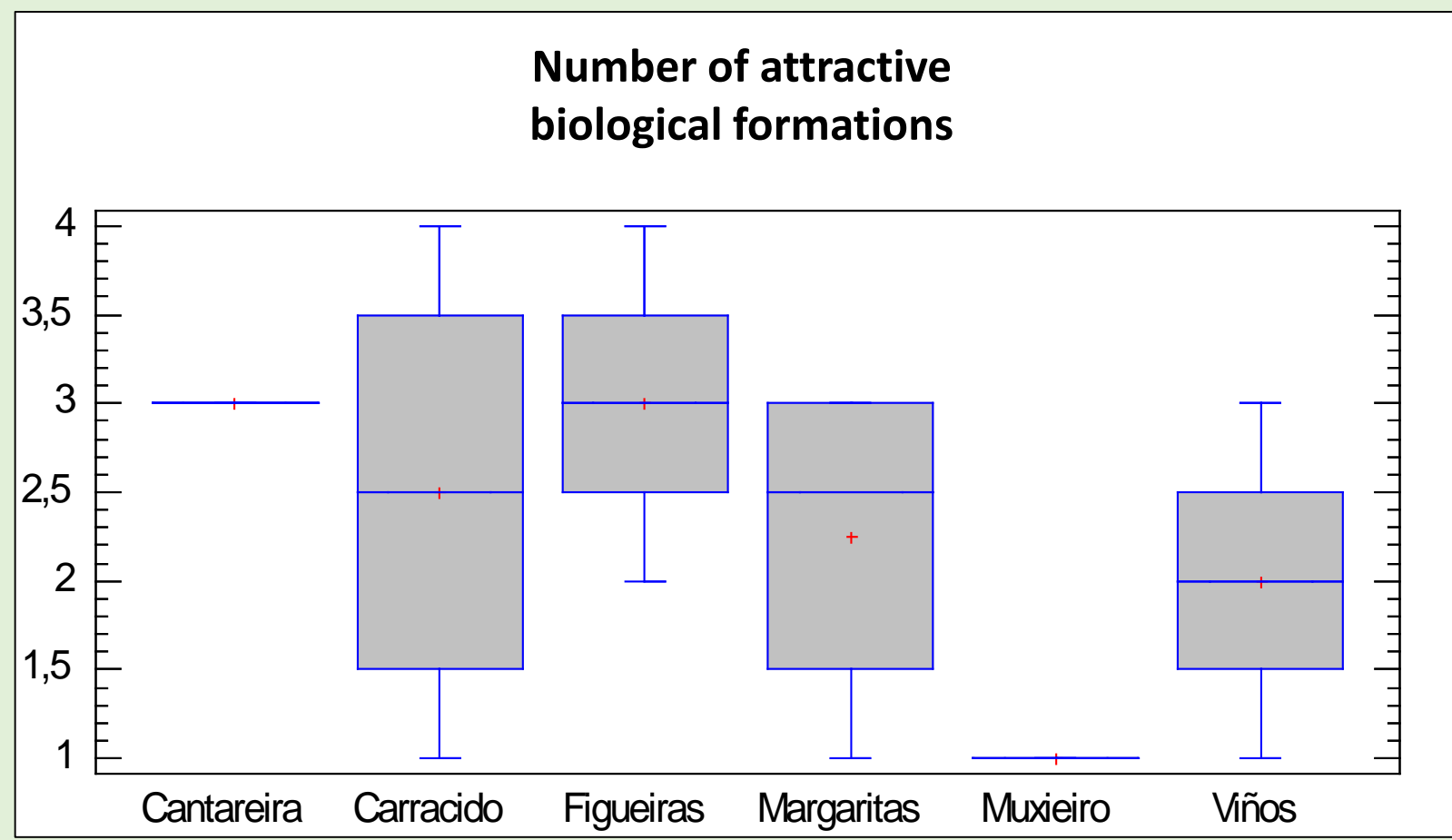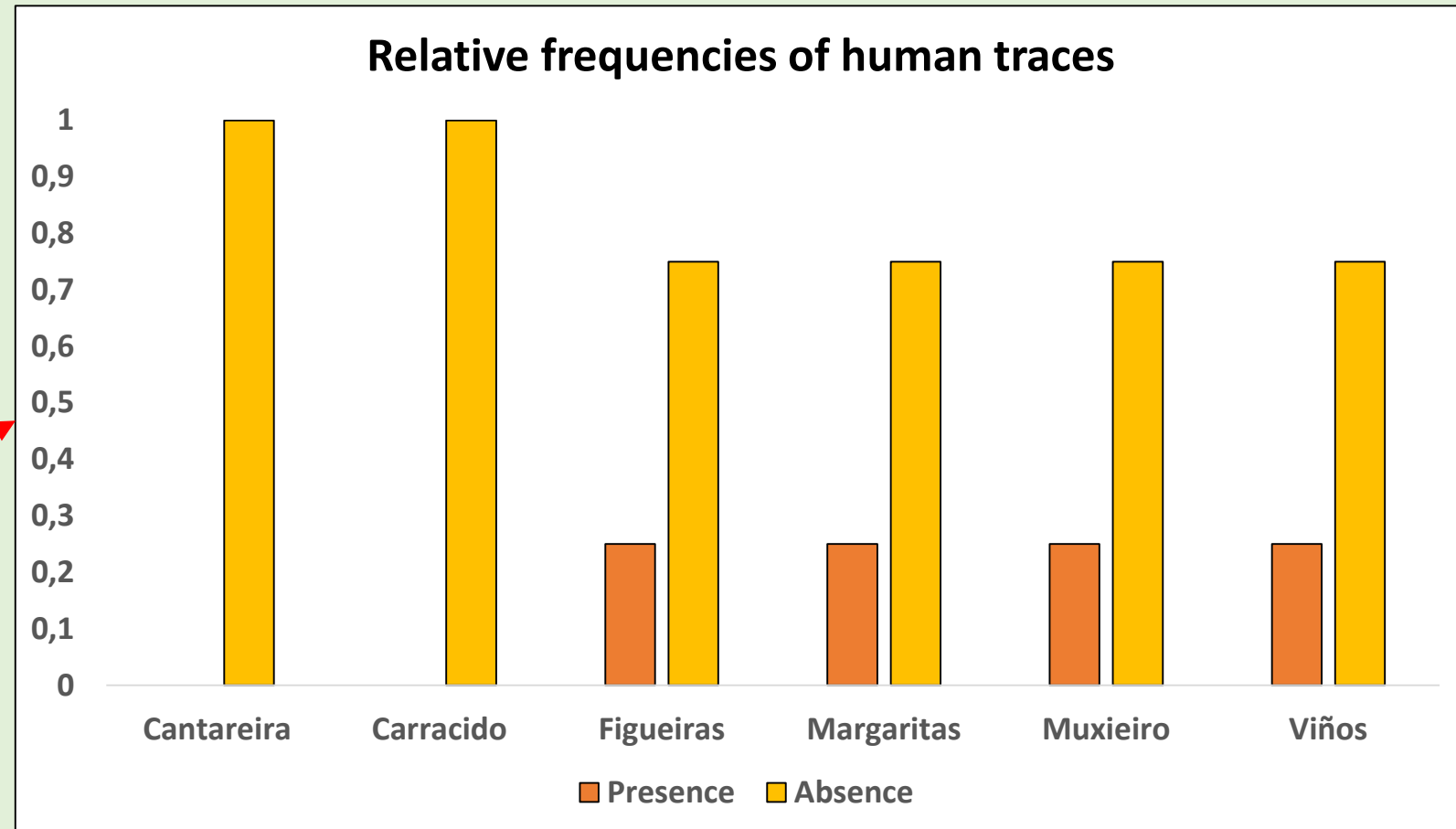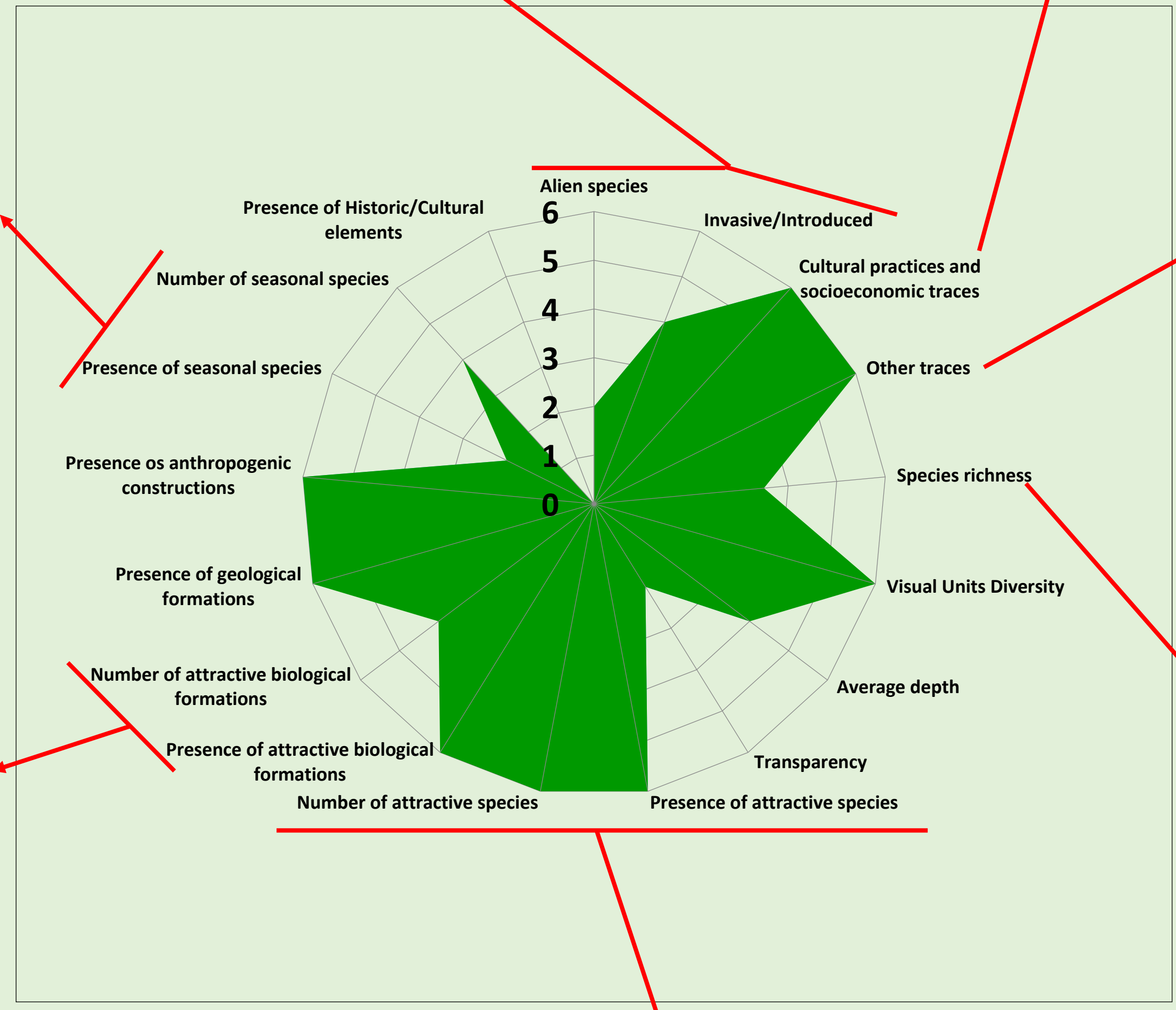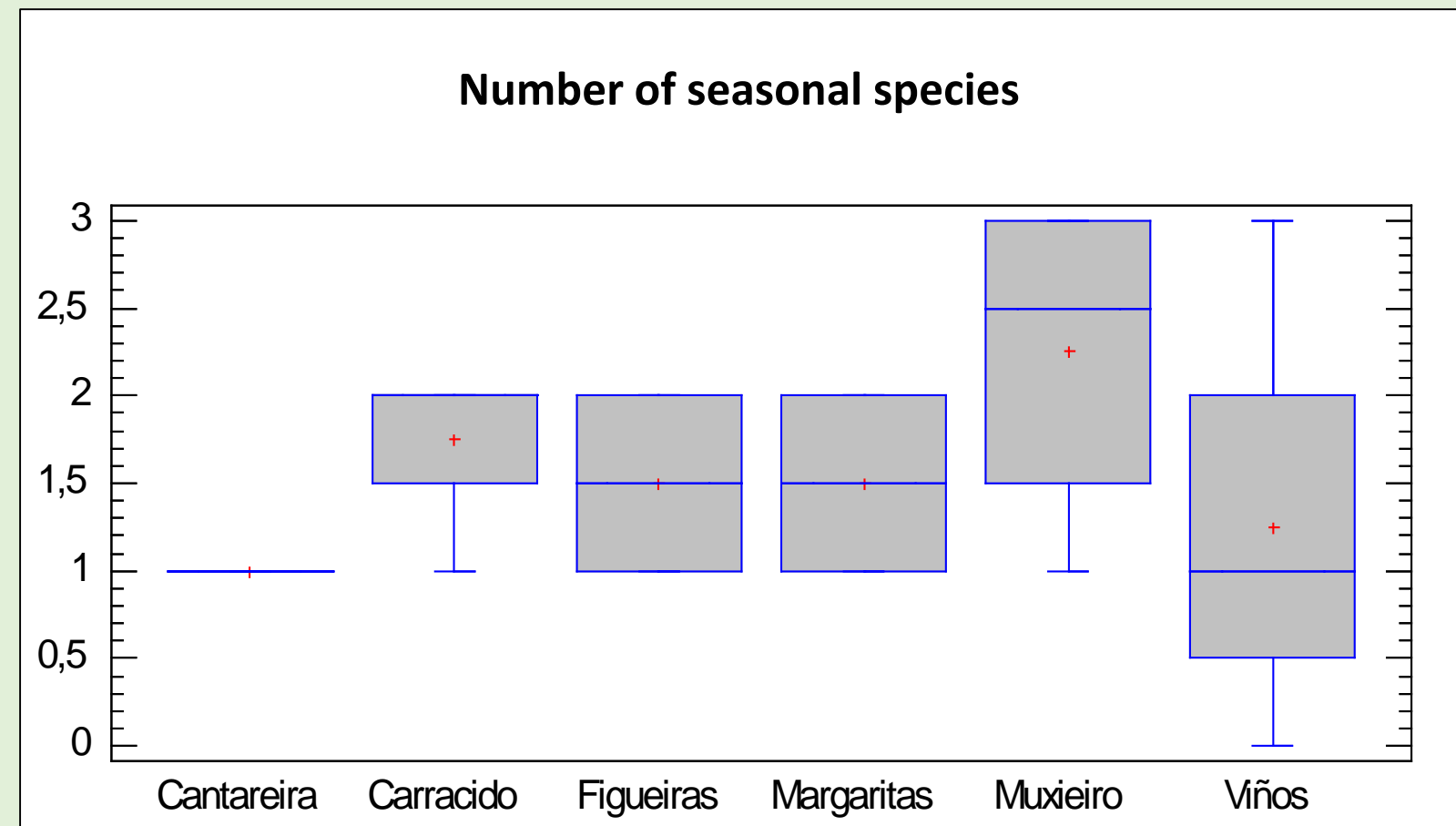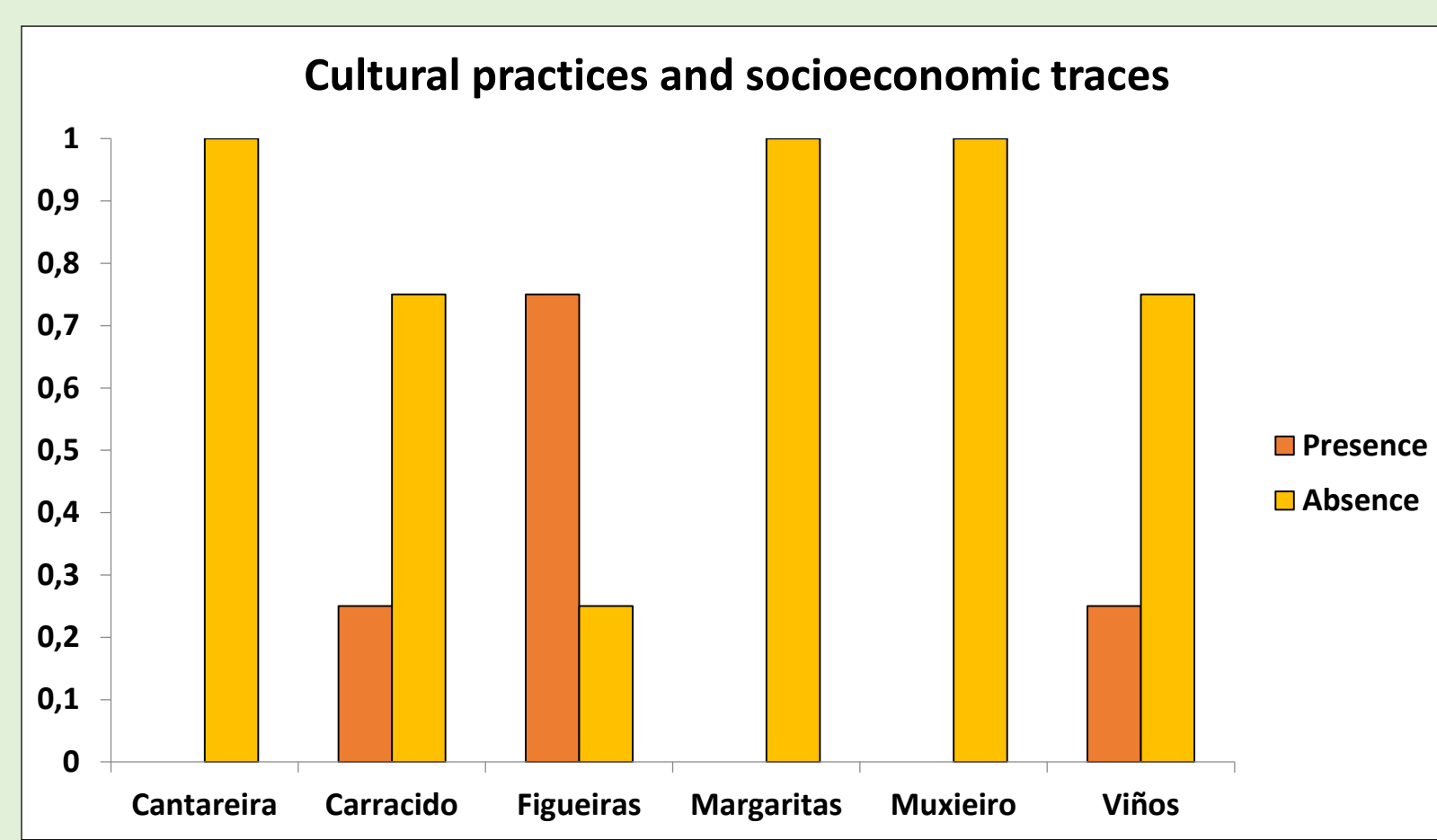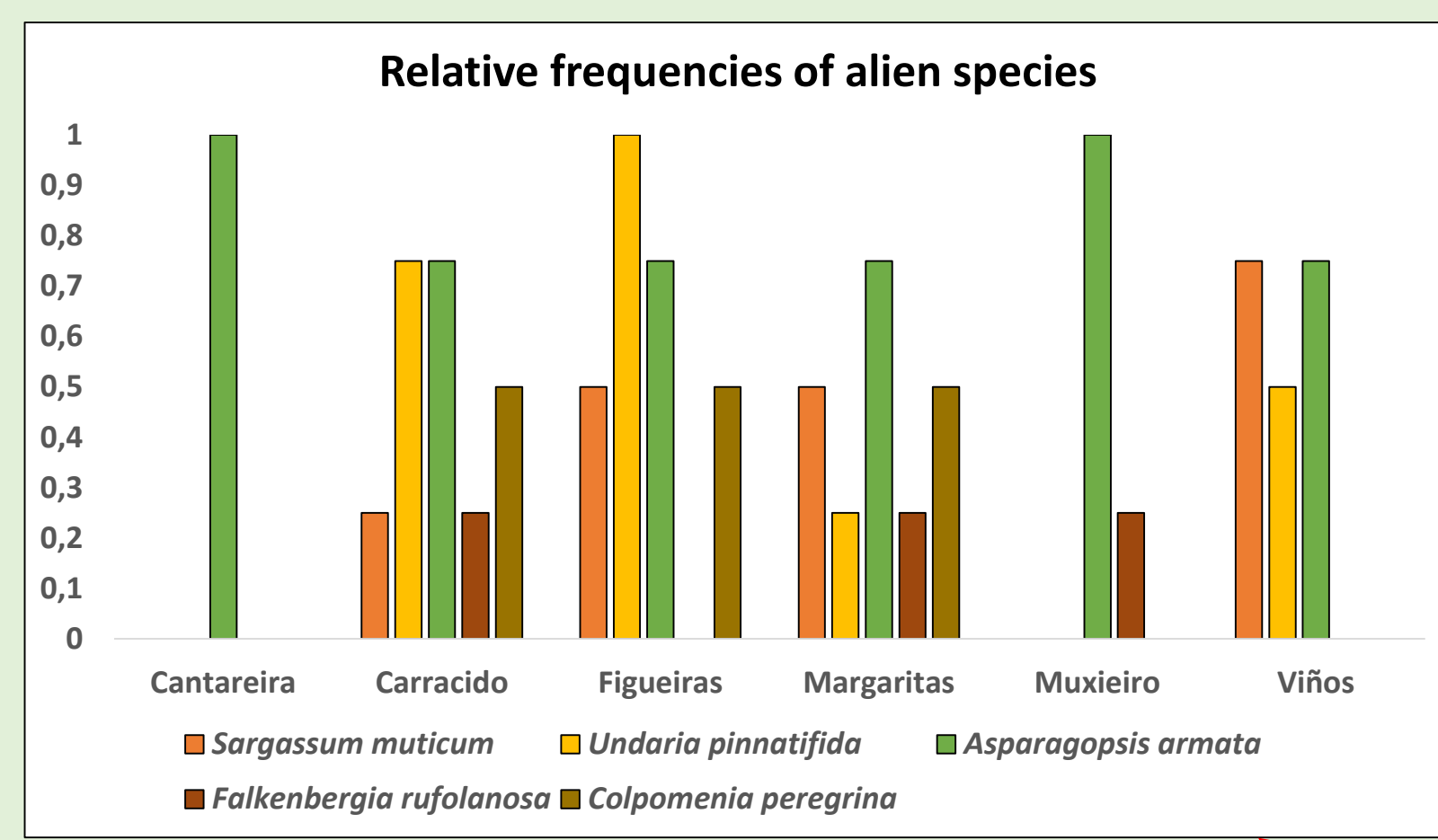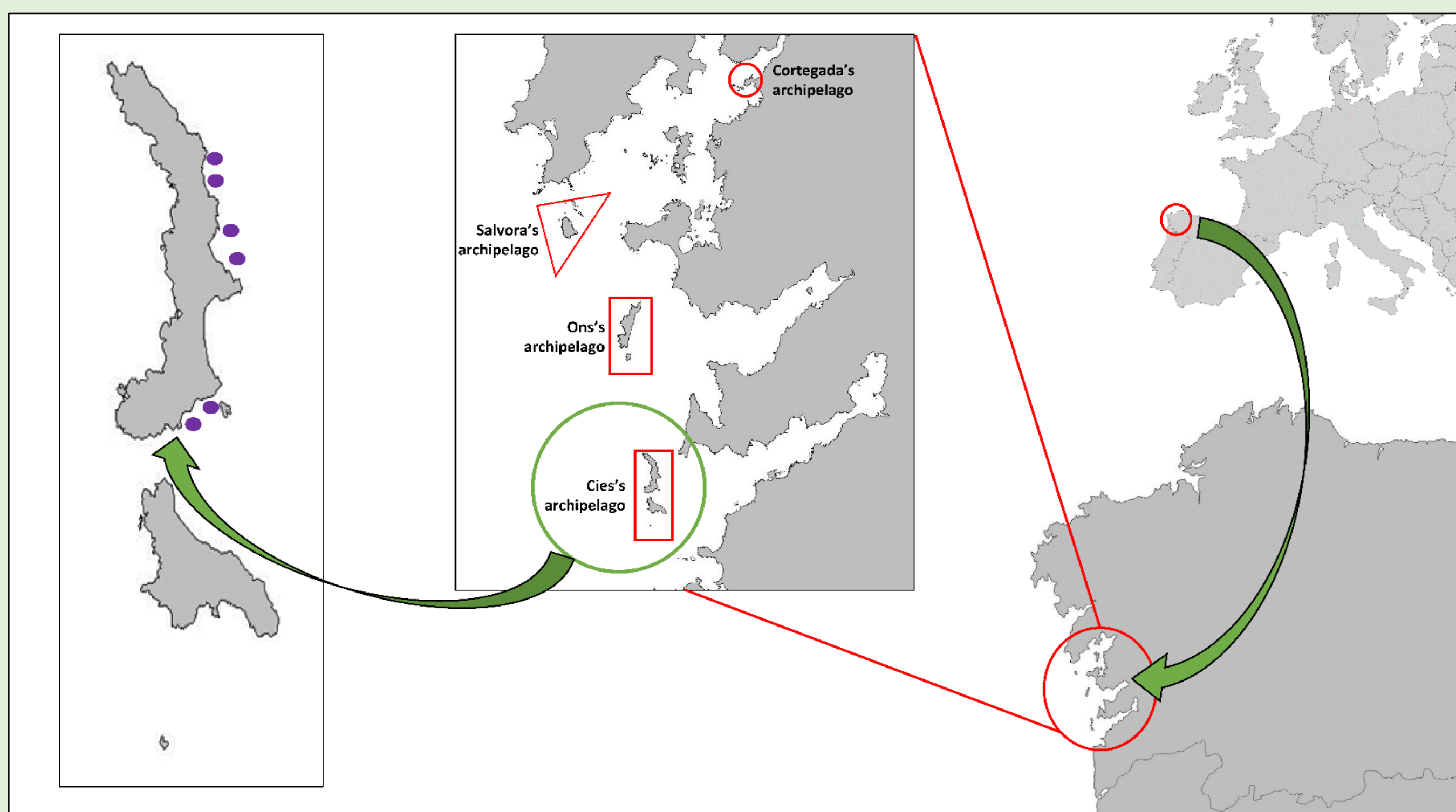
CONCLUSIONS

Our PSEs were easy to use in the field and possibly provided an appropriate assessment of what snorkelers perceive while diving. PSEs address both ecological and sociocultural aspects, and our results indicate that POI can be a suitable system for ranking submerged seascape. Besides, POI can provide a standardized tool to assess the weight of each concept (assessed with PSEs) on the visual quality of a particular seascape. This study represents a first attempt to design a methodology to evaluate the recreational value of submerged seascapes. Further study seems warranted where PSEs and POI should be applied to areas with contrasting scenic qualities to assess the sensitivity and discrimination ability of POI, and to further refine cut-off values for POI categories.