

The research article written by S. Blouet, L. Bramanti and K. Guizien builds an important knowledge for ecosystem management related to artificial reef deployment. Their work emphasizes the idea that artificial unit geographical position matters more than its immersion duration or depth. Their results suggest that implementation of such artificial units should not be done randomly but instead by selecting areas which could maximize recruitment and settlement of benthic organisms.

The article is well written, short and gets right to the point! I could still possibly see a few critical issues or some room for improvements. I will (try to) explain what are the critical issues I refer to and then detail what could eventually be improved along the manuscript.

Critical comments:

#1 I'm not a statistical expert but it seems to me that the artificial reefs investigated here present a vast array of shape and size. I'm particularly concern that these different designs could have a profound effect on the recruitment and the settlement of benthic organisms to start with. The figure 4 and the supplementary file are reinforcing this idea that the shape of the artificial unit could strongly influence your analyses.

So, is there any site where you could eventually test this assumption or eventually any references you could use to cover this aspect?

#2 Can you precise if the analyses were done on abundance data (L120-121) or on presence/absence data (L180). I am quite confused about how the data were processed but I admit I could have misunderstood this since your material and methods refers to presence/absence data but your results are not referring to it anymore.

#3 I understand that the use of different structure designs, at different time and different depths make your statistical design unbalanced and not all comparisons could be made (L183-188). However, this choice of format will probably make things difficult for the reader I would suggest to clearly state what are the factors that you want to test and summarize which group of ARs was used for testing each of those factors.

A suggestion here (just a suggestion) would be to extend your supplementary information by adding information about grouping and statistical tests. The reader will be able to see from this table which unit, into groups have been used to test each assumption. What do you think?

#4 It seems to me that you are trying to get rid of the structural complexity here as a factor affecting the recruitment and the settlement of benthic organisms. I would suggest 1-try to test structure if you have different structures with the same age immersed at the same site; 2-provide some kind of trend that you observe in your data which could minimize the structure effect (you have similar benthic composition found on different structures with the same age); or 3-acknowledge that structure could eventually affect your results but that it could not be tested in this present study.

I will detail hereafter some minor issues with the manuscript and suggest some alternatives to help the reading.

Abstract:

#5 At first, I kind of feel like the research question was missing from your abstract. I thought that it could be improved by introducing what is missing in the literature and what your study is dealing with: “While most studies focused on short term colonization history, we proposed to test immersion duration, geographic location and depth on the colonization of artificial reefs.”

After several readings I’m not too sure about it anymore, so feel free to consider it as a suggestion only.

#6 L15. Five sessile species [...].

Introduction:

#7 L35: Suggestion only => “Beneficial effects such as increases in fish biomass [...].”

#8 L39: When I read “The fish production argument [...]” I am sort of expecting to also read “The fish concentration argument [...]”.

#9 L62-76: I think after such a nice piece about the effect of the structural complexity you cannot escape from investigating this parameter in this present study (see critical comments).

#10 L77: I would mention in this sentence what is long term and remove the last sentence of the introduction which totally belong to the M&Ms section.

#11 L81: Golf de Lion (GDL) but Gulf of Lion (GoL)? If this is already used in the literature, I would suggest to follow otherwise feel free to ignore this comment.

Material and Methods:

#12 L97-98: Is there a reason for removing the artificial reefs deployed in 1992-1999?

#13 L101: I know that this information is already in your supplementary but I would give to the reader the full name of those sites, even if there are in French. I believe your research paper will attract a large panel of reader, not restricted to researchers. A clear communication on your M&Ms section will really increase the visibility of your paper.

#14 L103: So, each geographical sector has been divided into 2 or 5 sites. Into each of those sites, 3 sampling units were set up by pooling ARs to reach a minimum surface of 306 m² par site. Is that correct? I am a little bit concern here since your figure 1 is not showing this so I think the reader will easily get lost.

Similarly, to my previous critical comment I would clearly explain the grouping and subgrouping and summarize this information in your supplementary table (or eventually into another small table).

For instance, I would suggest to name these groups (Groupe I, or group “alpha”, or group “immersion duration” to refer to what was tested, directly). Then I would use this information in the M&Ms / Statistical analysis (“To test for XXX, we used group XXX which consist in XXX (See Supplementary file)”. I think this will be a lot easier for the reader.

#15 L113: Just to make sure, sampling units are artificial reefs, right?

Also, according I would follow the nomenclature of your supplementary and use GRU2 (or GRU-2) to mention the second sampling unit of GRU.

#16 L120-123: Did you count all individuals directly underwater or did you take photographs of each ARs and analyze the photographs later? How did you account for individuals from very small size? In my field (scleractinian corals), we usually always precise that all individuals larger than 5cm have been accounted in the survey because divers will always have missed newly recruited organisms. Maybe you could have this kind of information and detail a little more how specimens were accounted for.

#17 L121: “44 sampling units” could also be a little confusing here. I think a new format of Supplementary file could also help here.

#18 L124-176: I have several problems here. First of all, despite the fact that we are in the “Colonization assessment” section, this is more related to species distribution and traits. In addition, even if it’s important to explain why you chose these 5 species (and your choice is mainly based on their abundance across their distribution range), I feel like a lot of this should be move into the Discussion section. Finally, even if all those information are critical for your study, a table summarizing species traits would be welcome here.

So as a suggestion, I would create another sub-section after “Study area and stratified sampling design” to refer to why you pick those 5 species. This section could explain the distribution of these 5 species and briefly mentioned their life history traits with reference to a recapitulative table. Then the “Colonization assessment” will follow explaining how you collect your data. To me, most of the information from L147 to L176 should be discussed (and this information is indeed, discussed in your manuscript, which makes it redundant).

Results:

No particular comments on the results section.

Discussion:

#19 L245-247: The first sentence of the discussion is way to “heavy”.

Also, I would explain what you mean by “effective integration”.

Then would you say that the efficiency of the ARs for recruitment and colonization is essential to assess? Or just the dynamic of colonization?

#20 L247-249: I would tend to disagree with this sentence. The ARs there have been colonized by a greater number of species for sure, probably because ARs provide a suitable hard substrate for them. Your study “demonstrate” way more than just this simple observation and it arrives later from L249-251.

#21 L291-296: <https://onlinelibrary.wiley.com/doi/full/10.1002/ece3.6047> or <https://www.sciencedirect.com/science/article/pii/S0141113605000590>.

I’m not an author of these references but it seems to me that reef complexity can affect colonization and effective recruitment.

From my point of view this question is a little bit missing in this study. I understand the limitations you have here but I would suggest to either 1-try to test structure if you have different structures with the same age immersed at the same site; 2-provide some kind of trend that you observe in your data which could minimize the structure effect (you have similar benthic composition found on different structures with the same age); or 3-acknowledge that structure could eventually affect your results but that it could not be tested in this present study.

Figures and tables:

Fig3: The color for artificial reef area prospected and *Leptogorgia* is almost the same.

I would love to have a few more comments directly to the authors which they could explore further only if they think it fits their manuscript:

After reading L45-48 and L275, I feel like the message could be: If the location is ideal based on larvae availability and current (which maximize the availability of larvae in an area) would you recommend to set up ARs on sandy substrates? And how does this will affect sandy ecosystems (because even if they are less productive, they are still important and unique ecosystems with their own biodiversity and function)?

Also, in this study you targeted 5 species with contrasted life history trait but how would you connect your study with other species sharing (or not sharing) the same life history traits. Would you make some assumptions in your manuscript to deal with those cases?

An interesting assumption here in your manuscript is that ARs might not have reach a stable state yet (L270-273) due to the presence of *S. spallanzanii*. However, you also mentioned that 1- this species is relatively rare in natural settings and abundant on artificial structures. In this case would you eventually consider that these particular artificial reefs cannot mimic natural hard substrates? Or that the natural succession cannot occur on these artificial units?