2nd review of the manuscript written by Graco-Roza et al., entitled "Clumpy coexistence in phytoplankton: The role of functional similarity in community assembly" for PCI Ecology

I thank the authors for completing a thorough revision, and carefully replying to my comments. I especially appreciate the clarifications on some methods and definitions, and a more complete description of the results than in the previous version.

The authors have indeed added a statistical analysis (the RLQ + fourth corner analysis), in order to better analyze the relationships between environmental variables and species traits.
The results section is clearer and the authors have added a better exploitation of their results.
However, there is still room for improvement, and I still have comments to add.
Some results would need a better description, in order to be better discussed, and to help the reader to decipher between the results brought by the study compared to what was done before.

Abstract
L21-23: "Such a scenario results in a multimodal distribution of species abundance along the niche axis (e.g. body size), namely clumps". The term "clump" still deserves a clearer definition in the abstract L21-23.

Introduction
L76: Please avoid the term "important"; does it mean large, relevant, essential...?

L84 – 87. Please finish and clarify the sentence. Maybe the sentence should be cut: the first part should be associated with the next example from Coux et al. 2016, then some words on the use of these metrics.

L101: Add Barabas et al. 2013 ?

Methods
L169 : APHA 2005 : please check this reference

L176 : A p-value is indicated, but I do not figure out to which test this refers to ?

L201-202: could you please better explain the combined framework of RLQ + fourth-corner analysis? How are they combined? Hence why is it necessary to apply RLQ, then fourth corner, then combined version of RLQ+fourth corner?

L204-227: I thank the authors for adding some more information to define the "clumpy patterns". However, in this part, the term "clump" is never explicitly named. I would add a more explicit explanation, answering this question: what did you exactly consider as the clumps?

L228: Please add "we first calculated the functional redundancy (F_{Red}) and the differences in biovolume between pairs of species **(Diff$_{Biov}$)**...."

L229-230: "the functional redundancy was obtained by calculating Gower's general **dissimilarity**..."?

L234: could you please explain how F_{Red} is thus obtained from d_{jk} ?

L249: could you please explain how F_{Dist} is thus obtained from z^c_{ij} ?

L256: Could you please explain how is used the variable "clump position"

Results

L266 (and others): what is the p-value associated with this r = -0.10?
Is there an explanation to obtain such low r values?

L261-L294: The presence of mucilage and aerotopes do not correlate with any of the environmental variables. How could you explain that? Won't it be interesting to mention these results and discuss them?

L272: here, r seems to be equal to 0.09 rather than 0.9

Table 1: the total number of species is here 150, but this is 148 in Table S1.

L285-294, Figure 2: Please add in the legend that asterisks reveal the only significant relations.

L296-301, Figure 3: What is the rationale to show this figure? This figure is not well described here in the results section, and is not exploited in the discussion section.
Please add indications of "upper course", "medium course" and "low course" under the x-axis of figure A, and "dry" and "wet" under the x-axis of Figure B. This would help the reader to interpret your figure.
A maybe naïve question: we can see that MBFG groups IV and VI evolved in an opposite pattern (as a mirror image): when group IV declines group VI arises, and inversely. Won't is be interesting to describe and discuss?
The loess method would deserve some words in the methods section.

L318-331, Figure 4: Do the link between the circles mean that species belong to the same clusmp?
I would add the name of the species together with their code on the figure.
Figure 4C: Apply the same scale on the mean biovolume for the five graphs (from 0 to 0.04 mm^3 L^{-1}).

L332-338: Please add the species code together with the species name: *"....Pseudoanabaena sp.* 4 (spp 28) and *Pseudoanabaena catenata* (spp 12)….."* to help read the figure.

L337: "Only …" instead of "specifically…" since S14 is the only segment with significant entropy values at the lower course.

L356-358: Could you please precise where (which figure) did you observe that?

L358-362: Could you explain what is "The *upscaling* of biovolume …."
This sentence should be cut, and please clarify the description of Table 3, and the "take-home message" you want the reader to keep.
"The upscaling of biovolume with functional distinctiveness…..was particularly *different* in the wet season" Different from what? In which way is it different?
What are the values below each coefficient?

A lot of details are given in the table (df, residual standard…). If the values are not entirely necessary to understand the analysis, delete them.

L364: Maybe you can precise: "… and significant clumps (see Figures 4 and 5)"

L363-365: Could you add the number of samples for each correlation? This could maybe explain why, for example, for the medium course, the r = 0.171 is significant in the overall condition, while the r = -0,168 is not for the Clump II ?

Discussion

L367: How can your results, acquired in the Pihabanha river, show "that the clumps in body size are a **conspicuous** feature of phytoplankton community structure in riverine systems…." ? Please moderate or precise that your results, combined with previous ones (e.g. references from Segura et al.), suggest that clumps could be a noticeable feature of the phytoplankton community in river systems.

L377: as the abbreviation is used thereafter, L379 and L384, add it here: "…of high dimensional hypothesis (HDH, Clarke et al. 2007)

L392: Could you please precise what could be these adaptations?

L394: "…group IV dominated in low-flow waters with **high nutrient input**"; where is it described in the results section? SRP and DIN were (significantly?) correlated with Axis 2

L395: "group V and VI show **different adaptations** to survive in turbulent and **mixed conditions**": are they different from each other, or different from group IV? Could this be linked to the "mirror" evolution pattern for IV and VI we observed in Figure 3?

L400: Maybe again moderate "evident"

L403-405: It remains to be tested the trade off…" please rephrase

L418: "…were the main drivers of phytoplankton distribution"; maybe moderate : "..among the traits that we tested". Would it be interesting to add some words on the presence of mucilage and aerotopes?

L422-4327: Please cut the sentence to make it clearer.

L434-437: This should be linked to what was written L392-395
L437: see what is written L394: nutrient-rich environments were described for species from group IV ; is it also the case for species from group V and VI ? Please also clarify how to link elongated shape and nutrients-rich conditions?

L441-442: Please could you add the reference of this statement? Does it come from your results? (but see what is written L392-395 and L437)

Typo to correct:

L63: add a space: "ecological requirement**s (**Gravel al. 2006…)

L92: "….offer **an excellenta highly interesting**….." : please chose : "an excellent…" or "a highly interesting…." ?

L93: what is **speciose** ?

L99: add a space : "Litchman et al. 2010**) a**nd …"

L106: Please choose between "uses a" or "is a …"

L115: remove "**and**" in "heterogeneous **and**systems"

L177: remove the bracket inside the bracket, before "Lund…" : "(……p < 0.05, Lund et al. 1998, ….)

L184: remove the bracket : "…according to **Kruk et al. (2010)**"

L282: Replace "**WT**" by "**T**"

L309: "Moreover…" instead of "However…" ?

L376: Chose "hypothesis" or "explanations" in "**hypothesisexplanations**"

L387: remove "energetics" in "**energeticsenergetics**"