Re: Resubmission for Biogeosciences

Dear Prof Dr. Tina Treude,

Thank you very much for the opportunity to resubmit the manuscript 'Calcareous test growth rate of Spirulina vivipara (foraminifera)' for Discussion on BGD. We believe that the constructive comments and criticisms of the reviewers have helped us to improve the quality and clarity of our work.

Following feedback from the reviewers, we have revised the manuscript. In particular, we have corrected oversights relating to Figures 3 and 4 and ensured accurate referencing and presentation in the text. In addition, we revised the statistical analysis methodology to be more consistent with the sample size and nature of the data. We believe this has strengthened the validity of the findings,

Each point raised by the reviewers has been addressed in the detailed response document attached to this submission.

We believe that these corrections have significantly improved our manuscript and will contribute significantly to the field of foraminifera research.

We would like to express our deepest thanks to the editors and reviewers.

Sincerely yours,

Yukiko Nagai

Dear Anonymous Referee #1

Your constructive comments have made our manuscript very improvised. In particular, the introduction is now more mature, and the statistical treatment is more relevant. These authors are deeply grateful.

Our response to your points and comments as follows.

1) The subject of the paper falls in the general scope of Egusphere. The Ms focuses on understanding and evaluating the test growth rate of the foraminiferal species Spirillina vivipara under different culture conditions.

   Thank you for finding value in matching this journal about this manuscript. We, the authors, are very much encouraged.

2) >the introduction would include the morphological description of S. vivipara as well as its biology and ecology;

   Thank you for pointing this out; we have added information on the ecology of S. viviparas, including its morphological features and recent observations to the introduction. We have also tidied up the balance of the description. (P.2 L36-48 in the manuscript clean copy. Same hereafter.)

3) >M&M section lacks some important information such as calcein (green?);

   More detailed descriptions of the experiments and observation methods using Calcein are provided to ensure reproducibility (P3L65-68; L75-84).

   >Green?

   No. It is normal Calcein. Regular Calcein is used which does indeed show green fluorescence but does not have “Green” in its name. In addition,

4) >the number of specimens and replicates would be included;

   As you point out, this is important information and the number of individuals and measurements were specified. (P3L70; L82; P4L104)

5) >the statistical analysis would be likely redone. Pearson correlation is applied when data from both variables follow a normal distribution. Given the limited number of data (i.e., Figure 3), authors would have better used a Spearman’s rho correlation that has no normality (non-parametric test) assumptions. Please also clarify if reporting the coefficient of correlation or determination;

   We thank the authors for their valuable comments on the statistical analysis. As you indicated, it

was appropriate to treat our data as non-parametric data. In addition, the Spearman's correlation coefficient, which you named, was suitable and we redid the analysis to incorporate this method. The manuscript has been updated considering these results. (P4L109-115; P5L145-152)

6) >Figures 3 and 4 are not cited in the text;

You are right to point this out. The text can now be tracked by referring to the resulting graphs, with reference to the respective figures at the appropriate points in the text. (Fig. 3: P5L136; Fig. 4: P5L148, 151, 160)

7) >paragraph 2.3 details the methodology for ultrastructure observations (i.e., TEM) that are not reported.

Paragraph 2.3 has been restructured and describes the purpose of this analysis, as well as the pre-treatment and analysis methods. Though the study did not use TEM, but rather microprocessing and observation with a Focused Ion Beam Scanning Electron Microscope (FIB-SEM). The description of the method was incomplete. In accordance with Referee #1's suggestion, the analytical conditions and other information were completed. (P4L103-1105).

All points raised by Referee #1 on the PDF have also been corrected and reflected in the latest draft. Your kind corrections are deeply appreciated.

Dear Dr. Delphine Dissard (Referee #2)

We are profoundly grateful for the time and effort you have dedicated to peer-reviewing our manuscript.

> A major downfall though is the lack of description on the number of specimens involved and replicates considered which needs to be added clearly within this manuscript.

You have correctly pointed out that the text did not specify the number of samples used. We ensured this sample size is accurately incorporated . (P3L70; L82; P4L104)

> I am also not convinced about the results of statistical analyses on such a small dataset, hence the precise description of the data set should help the reader to understand the depth of described statistical results.

Your point about statistical treatment is true. This matter was also taken up by Referee #1, who adviced to use a more appropriate non-parametric statistical method (Spearman's rank correlation coefficient). This test rejected the hypothesis of statistical dominance, although a weak correlation was found between the size of the specimen and growth rate . (P4L109-115; P5L145-152)

> Number and significance of figures are ok, but maybe table 3 and 4 would rather belong to the supplementary material. Similarly Fig. 3 and 4 are not discussed within the manuscript and should therefore either be removed or described.

We included the descriptions of Figs. 3 and 4 within the text. (Fig. 3: P5L136; Fig. 4: P5L148, 151, 160). We would like to keep Tables 3 and 4 in the main manuscript since they contain the essential data of our consideration.

> Finally, the two videos of time-lapse images that can be found in the supplementary material are welcome and of great interest. To conclude I recommend the publication of this manuscript after minor revisions.

Thank you for the positive feedback on our video data and manuscript. It was very encouraging for us, as we are conducting research using this kind of visual data.

Minor comments:

>Ligne 158 refers to table 5 not 3

Thanks for pointing this out, we revised to fix it. (P6L168)

>Number of specimen used for calcification rate determination should definitely be included.

We stated the number of specimens. (P3L70; L82; P4L104)

>Fig 3 and 4 not discussed in the text.

We are very sorry about this mistake. We included description about Figures 3 and 4 to indicate the figures where appropriate. (Fig. 3: P5L136; Fig. 4: P5L148, 151, 160).

>line 31, references should be listed within the same bracket.

Thank you for pointing out. We fix it. (P1L30)