

Comments on “Ecophysiological characteristics of red, green, and brown strains of the Baltic picocyanobacterium *Synechococcus* sp. – a laboratory study”

General comments

I read the manuscript and found that the authors arranged the experiment in an elaborate way and the results reported may have some significance in biogeochemistry in the Baltic Sea. However, the authors totally failed to describe what is important and what is the ecological significance. The authors just presented list of outputs in the Result section, which made me fatigue. I believe that this is because the authors were not conscious enough on what is to be clarified in this study. In the Discussion section, the authors make some ecological discussion as if they had just come to this issue for the first time. However, such an issue should have been presented in the Introduction and the authors should have clarified what is the REAL OBJECTIVE. If the authors successfully notice what is the objective, the Result section could have been more arranged with appropriate selection of what is necessary and what is not.

Additionally, wording and phrasing in English were terrible. Actually, I could not catch what the authors meant in some sentences. I felt that many sentences are just literal translations from the authors' mother language. I STRONGLY RECOMMEND the authors to have this manuscript checked and edited by a native English speaker or an editing service.

And the authors should reduce the volume of the manuscript. It is too lengthy and redundant. Probably most of the Results section can be omitted, if the authors notice what is important.

Specific comments

L44 This is confusing and I am afraid that the authors may have misunderstood the pigment of cyanobacteria. PE and PC are apoproteins, while PUB and PEB are phycobilins connected to apoproteins. These are different concepts. The readers may question “What is the phycobilin composition of red and green strains?” or “Both red and brown strains contain PE... What is the difference?”

L84 If this is your overall goal, this journal is not suitable for you. You should submit your manuscript to the journal more oriented to physiology. You should aim at a more ecological issue.

L87 Minute figures for experimental settings should not appear in the Introduction. It appears again in Methods and redundant.

L108 Information on salinity appears again in L116. It is redundant. Generally, this section is too wordy and redundant. Make it clear.

L125 If the authors use halogen lamps only for higher irradiance, there would make difference in the spectrum of the light received among the “scenarios”. As the authors know, the wavelength is an important factor for the growth of different strains of *Synechococcus* sp., because the different phycobilin compositions result in different absorption spectra of their photosynthetic antenna. How do the authors explain it?

L147 This sentence should appear first of the paragraph.

L148 Do the authors mean “volume-specific” by “mL-specific”?

L171 Replace “through” with “onto”, because the authors use the particle filtered onto a filter for analysis.

L197 Why did the authors ignore the salinity for independent variable and their confounding effects?

L206 Use tables to show the significance of relationships between the variables. The endless listing of the values does not interest the readers.

L217 The authors just examined for different light intensities, and the setting over 190 is just one setting, 280. Then is it appropriate to use “onward”? The authors cannot tell whether the cell abundance continues to decrease “onward”. One biggest concern about that is that it may be inappropriate to use ANOVA to describe such a relationship, because it is based on the assumption of linear relationship between the two variables.

L219 This description is too speculative and far from quantitative. What do you mean by “important”? And on which result is this description based on? This comment points to many other sentences in this section.

L228 Actually, I could not understand what the authors intended to say in these sentences (to L234). Please rearrange them.

L488 From here on, every paragraph is just a repetition of the first one, where some figures may have been replaced. It obscures what is important and which the reader should be reminded of. My question here is only “So what?”.

L544 Cite appropriate literatures to support this description.

L573 “Acclimation” means the phenotypic phenomenon that one organism strengthens its ecological fitness by changing gene expression. Do you mean it here or did you intend “adapted”?

L590 Why only in this scenario? Is it a universal phenomenon?

L591 You say “also”, but in addition to what?

L617 “the Baltic inhabitants are highly adapted to different regions” This sentence is too abstract.

L620-L625 These should have been placed in Introduction.

L640 This paragraph should have been placed in Introduction.

L644 What is “new information”? How is it related with your results?

L678 “This study shows differences and similarities” This sentence does not give any information. EVERY STUDY shows differences and similarities among different things. How different? Which is how? At which point different? What does it mean?