Biogeosciences Discuss.,
https://doi.org/10.5194/bg-2017-369-RC1, 2017
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Biogeosciences Discussions
Open Access
EGU

Interactive comment on "Eco-physiological characterization of early successional biological soil crusts in heavily human impacted areas – Implications for conservation and succession" *by* Michelle Szyja et al.

T. Fischer (Referee)

thomas.fischer@b-tu.de

Received and published: 12 October 2017

The particular value of the study is the comparison of the eco-physiological performance between a cyanobacterial and a green-algal biocrust from temperate habitats, which are somewhat underrepresented in the biocrust related literature. I recommend publication of the manuscript after minor revision.

Minor remarks

Remark #1: Figure 4: I guess the upper line in each graph is under light, and the lower

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line in the dark? What was the PPFD?

Remark #2: p. 7 l. 26 and Fig. 5: Water contents are given in mm here, but as normalised water content in the rest of the manuscript. I think the paper would benefit from providing some information on how many mm were 100% for each BSC type. For soils, water content expressed as mm links with volumetric water content (or water potential) through soil texture, depth and humus content, which are essential to relate to each other optimum moisture ranges for BSC_all, BSC_dom and BSC_soil. While, for example, the optimal ranges for G-BSC_dom and C-BSC_dom are similar, the difference between G-BSC_dom and G-BSC_soil is larger than the respective difference for the cyanobacterial crust: This could mean that the amount of fine particles, or sampling depth, or soil C, or all together, were greater for the Zygogonium crust. The authors are aware of that point (p. 9 l. 12-13): "A general difference between BSC_all and BSC_dom concerning optimal water content is likely owed to the different water holding capacities of the soil."

Remark #3: p. 8 l. 19-20: High abiotic CO2-release may point to carbonates being present in the soil solution and to high pH. The authors discuss that issue on p. 10 l. 20 ff.

Remarks #2 and #3 let me recommend to provide some information on soil texture class, pH, organic C content and sampling depth for each site in the M&M section.

Remark #4: p. 10 l. 1-2: The authors state a higher water holding capacity (WHC) of the Nostoc crust than the Zygogonium crust and attribute this to exopolysaccharides (EPS), which is in full agreement with the literature. However, apart from its lower NP performance, the Zygogonium crust had higher amounts of chlorophyll (Table 1), which traditionally is interpreted as a biomass equivalent. Is it possible that high Zygogonium biomass compensates for high WHC of the EPS of Nostoc? I think that the statement of higher WHC of the Nostoc crust could be substantiated by some experimental data, or, for example, from presenting some close-up photographs of the crusts to get a visual

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impression of crust development.

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