



EGUsphere, referee comment RC2
<https://doi.org/10.5194/egusphere-2022-1290-RC2>, 2023
© Author(s) 2023. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on egusphere-2022-1290

François Maillard (Referee)

Referee comment on "Effects of Warming and Increased Precipitation on Soil Amino Sugars on the Qinghai–Tibet Alpine Meadows" by Baisha Weng et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-1290-RC2>, 2023

This study investigates how experimental warming and precipitation modifications affect the accumulation and composition of microbial residues in soils. The authors also quantified how soil parameters and enzyme activities respond to increased warming and precipitation. They found that increased warming and precipitation induced modifications in most measured parameters. I believe this type of work is timely and important to understand how future climates will influence the stabilization and persistence of microbial residues in soils. Yet, this manuscript presents major caveats that, I think, make it not suitable for publication in its actual state. Most notably, there is no explanation of the logical links between the different measured parameters (soil parameters, enzyme activities, and microbial residue concentrations and compositions). This makes the introduction and the discussion sections rather challenging to understand. Additionally, the authors often mixed living microbial communities and microbial residues. Finally, I have some concerns about the statistics used by the authors, notably the structural equation models.

Please see below for my feedback, which I hope might help to improve the overall quality of the manuscript.

Best regards,

Dr. François Maillard

Introduction

The introduction is hard to follow because of its lack of structure. Specifically, there is no apparent logic or causal links between the different parameters the authors assessed. It is also reflected in the fact that there are no clear hypotheses regarding the potential direct and indirect effects of warming and precipitation modifications on the composition and concentration of soil microbial residues.

Could the authors also include hypotheses related to the soil depth in this section?

Materials and methods

This section is pretty clear and well-written.

Could the authors explain why they considered their p-values significant at a threshold of 10%, not 5%, as it is typically done?

In light of the standard errors, slight differences in microbial residue concentrations, and relatively low number of replicates, I wonder if the effects of the different treatments are significant (Table 3).

Why are the concentrations in soil amino sugars expressed with different units in Table 3 and the Results section?

Results

This section, like the introduction, is challenging to follow. Parameters from different natures (soil parameters and enzyme activities) are mixed, and it isn't easy to see the point here.

Discussion

4.1 Paragraph is very confusing as the authors mixed the composition in microbial residues with potential interpretations regarding the source of these residues (i.e., bacterial and fungal community composition or abundance), that they did not assess.

Additional comments

Title Perhaps the authors could be a bit more precise about "Soil Microbial Residues". Does it relate to microbial residue stocks or composition?

7 Maybe change "explore" for another verb like "determine", "assess", etc.

7-10 It lacks a logical link between microbial residues and soil carbon stocks.

10 Maybe change for "might affect soil microbial residue composition and concentration due to..."

12 Remove "the" in "the semi-arid grasslands"

13-19 I understand that "Soil Microbial Residues" relates to composition (bacteria/fungi necromass) and stocks. Yet, I think that part of the abstract is a bit confusing and could be improved by explaining the readership that the authors assessed both the composition and concentration of the microbial residues.

23 "Highly stable" regarding what? Their resistance to microbial decomposition?

24 Change "their contents" for "they"

25 If they are highly stable, how can they also be essential components of the soil's active

organic nitrogen?

26 It is redundant with I.23. Maybe try to merge both sentences?

26 Maybe explain why only these three amino sugars are quantified.

29 GluN is the major component of chitosan, but not of chitin.

30 Indicators of biomass? Or necromass? Or both? It is unclear here why authors would use biomass indicators to quantify microbial residue concentrations.

33 "Amino sugars, extracellular enzymes, and decomposers" I don't understand the logical link between these three components in this sentence. I guess it is that decomposers secrete extracellular enzymes that break down polymers into amino sugars.

37 "soil community structures, ecosystem, and biosphere." Again, I don't understand the logical link here between these three things.

44 Remove "the"

58 "soil microorganisms" or the fate of soil microbial residues?

80 "field"

81 Unclear

83 "we aimed at testing the effects"

84 "this site was a suitable place"

88 Plant biomass, microbial biomass, animal biomass?

105 This would be better in the introduction section, as explaining the link between microbial residues and extracellular soil enzymes would be useful.

124 I don't understand why the standards don't correspond to the amino sugars measured by the authors. However, I am unfamiliar with this technic, so I apologize if it is a normal procedure.

134 The authors used SEM to test for the relationships between factors, meaning they have developed a pretty clear idea of the causal relationships between them. Thus I suggest the authors use this a priori model to improve the structure of the introduction section.

144 Is it standard to express amino sugar concentrations in ug/ml and not in ug/g of soil, for example? Also, change $\mu\text{g/g}$ for $\mu\text{g g}^{-1}$ throughout the manuscript.

200 GluN is a monomer directly accessible to most microorganisms, so it is not resistant to microbial breakdown. It might be stabilized in the soil through associations with minerals, though.

204 It sounds like "living fungal dominance". Could the authors be less ambiguous about living or dead biomass?

206 "the population characteristics of soil microorganisms" It sounds like living fungi, not fungal residues.

215 "community structure" confusing

217 Confusing

236 Unclear

239 Unclear.

243 Amino sugars themselves are not subjected to decomposition as they are monomers. Maybe I don't understand the technics, though. Are the amino sugars quantified after full hydrolysis of the polymers in the lab? I apologize if it is the case.

268 Unclear

SEM: Did the authors build an a priori model to test the relationships between the measured parameters? It seems that most SEM models they constructed don't make much sense regarding my knowledge of soil microbiology (the causal link between xylosidase activity and GluN, for example?)