SOIL Discuss., author comment AC1
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Reply on RC1

Ling Sun and Jinggui Wu

Author comment on "Combined application of animal manure and straw benefit soil fauna community in dryland farming" by Ling Sun and Jinggui Wu, SOIL Discuss., https://doi.org/10.5194/soil-2021-132-AC1, 2022

ANSWERS/ CORRECTIONS TO THE REVIEWER'S COMMENTS

Reviewer 1

- Line 14:the use of chicken manure, ox manure andpig manure. A total of 12459 soil fauna

Answer: these have been corrected.

the use of chicken manure, ox manure or pig manure. A total of 12459 soil invertebrates

- Line 16-17:Treatments animal manure combined with straw led to increased the number of soil fauna groups and individuals, diversity index, richness index and dominance index, while reduced the evenness index of soil fauna

Answer: this has been corrected. Treatments with animal manure combined with straw led to increased richness and abundance of soil invertebrates.

- Line 19:maize straw plus chicken manure and maize straw plus pig manure treatments had the largest number of soil fauna groups.

Answer: this has been corrected. maize straw plus chicken manure and maize straw plus pig manure treatments had the largest richness of soil invertebrates.

- Line 20:"Oribatida, Astigmata, Desoria and Folsomia," none of those are species, rather two suborders and two genera

Answer: this has been corrected. Among all the treatments, Oribatida, Astigmata, Entomobryomorpha were the dominant groups.

- Line 28:especially the application of maize straw plus pig manure was the most effective treatment for enhancing soil fauna community.

Answer: especially the application of maize straw plus pig manure was the most effective treatment for enhancing richness and abundance of soil invertebrates.

- Line 35:(Brussaard, 1998). Please update this reference - a lot has been published since 1998 that support your statement.

Answer: this has been corrected.

Briones, M. J. I.: The Serendipitous Value of Soil Fauna in Ecosystem Functioning: The Unexplained Explained [J], Front. Environ. Sci., 12(07), https://doi.org/10.3389/fenvs.2018.00149, 2018.

- Line 37-40:"Different fauna groups have different sensitivity to soil environmental changes, so it is particularly important to study the abundance and community composition of soil fauna (Lakshmi et al., 2017)."But why? It's missing an end to the sentence.

Also: https://doi.org/10.1016/j.pedobi.2021.150772

for species-specific responses to environmental changes.

Answer: Different fauna groups have different sensitivity to soil environmental changes, and the composition of soil fauna can reflect the soil environment where they live after different organic materials are returned to the field. Therefore, it is particularly important to study the abundance and community composition of soil fauna (Lakshmi et al., 2017; Barreto et al., 2021).

Barreto, C., Branfireun, B. A., McLaughlin, J. W., Lindo, Z.: Responses of oribatid mites to warming in boreal peatlands depend on fen type [J], Pedobiologia, 89, 150772, https://doi.org/10.1016/j.pedobi.2021.150772, 2021.

- Line 44: change soil

Answer: this has been corrected. change the soil environment

- Line 63: "formation of soil nutrients."I believe you want to say transformation? How are fauna creating nutrients?

Answer: this has been corrected. "transformation of soil nutrients."

- Line 72: "dark brown soil", may need to be more specific than this.

Answer: in a Humic Cambisols.

- Line 73: "The research results will help to identify the most suitable animal manure and straw for improving soil fauna."so, you say this a lot: improving soil fauna. But what specifically do you mean here? It reads very vague and many interpretations can be taken from this

Answer: The research results will help to identify the most suitable animal manure and straw for improving composition and abundance of soil invertebrates.

- Line 75: "hypothesized that applying AM-S would affect the composition of fauna communities, while different animal manure might have different effects on soil fauna function and diversity."and why did you hypothesize those?

Answer: this has been removed.

- Line 85: "dark-brown soil"under what classification?

Answer: The soil is classified as dark-brown soil, the term used is Cryumbreps in the American soil classification system, and Humic Cambisols in WRB with a pH of 6.3.

- Line 91:The field was arranged in a randomized block design consisting of twelve plots (50 m^2 each) with four treatments in three replicates. Do you mean you have 12x4x3 samples? 144 samples in total?

Answer: 12 plots (4 treatments x 3 replicates). The field was arranged in a randomized block design consisting of with four treatments in three replicates (twelve plots, 50 m^2 each).

- Table 1. Basic properties of the initial organic materials. "24 ± 0.3c"different font.

Answer: this has been corrected.

- Line 106:amounts of C (7738 kg C ha^{-1}) can be applied in each plot.

Answer: amounts of C (7738 kg C ha−1) could be applied in each plot.

- Line 113:"However, the focus of this study was to sample the litterbags for the experiment." this comes out of the blue.

Answer: this has been corrected. In this experiment, nylon net bag method was used to determine soil invertebrates.

- Line 115:"An in situ soil burying test of a nylon net bag was conducted in May 2019." this reads awkward.

Answer: An in situ soil burial test of a nylon net bag was conducted in May 2019.

- Line 117:"The crushing length of the stems and leaves was about 8 cm" please revise this construction.

Answer: this has been corrected. The stems and leaves were cut to approximately 8 cm in length.

- Line 123: "There were 60 sample bags (4 treatments × 3 replicates × 5 samples)", how do you only have n=60 now? It's hard to follow.

Answer: 4 treatments (maize straw only, S; maize straw plus ox manure, SO; maize straw plus chicken manure, SC; maize straw plus pig manure, SP), 3 replicates, and sample bags were destructively retrieved in May, June, July, August and September (5 samples).

- Line 125: "followed by addingthe animal manure of each treatment", so you had manure inside the litterbags?

Answer: yes, there was animal manure in the litterbags.

- Line 130: "after the bags were buried."at what depth? how far from each other?

Answer: about 20 cm deep. About 1.5 m away from each other.

- Line 135: "After fixation and preservation, the collected soil animals were classified,"this is the wrong term.

Line 136: "identified and counted with a stereomicroscope. Soil fauna were mainly classified..." identified.. to what taxonomic level?

Answer: After fixation and preservation, the collected soil animals were identified, identified and counted with a stereomicroscope. Soil fauna were mainly identified to genus level according to Chinese Soil Fauna Retrieval Guide (Yin, 1998).

- Line 149: "S represents all groups of soil fauna", S represents richness.

Answer: S represents richness.

- Line 185-186: Relevant data tables and graphs were obtained using 185 Microsoft Excel.

Answer: this has been removed.

- Line 190: "*Oribatida*, *Astigmata*,"these are not genera and must not be in italics.

Answer: Oribatida, Astigmata,

- Line 192: "common taxa were 3 species."those are not species. also 3 should be spelled.

Answer: common taxa were three taxonomical groups.

- Line 197: "The number of soil fauna groups in each treatment showed in order of SP=SC>SO>S."this is a duplicate from your table 2

Answer: this has been removed.

- Table 2 "Nameof soil animal,""Group number" morpho-richness

Answer: these have been corrected.

- Line 205: "Monthly dynamic changes of individual and group number of soil fauna"what do you mean?

Answer: Monthly dynamic changes of abundance and richness of soil invertebrates.

- Line 206:"The number of groups and individuals of soil fauna showed different changes in different sampling months" please be consistency with language. Do you want to say richness and abundance here? I don't know

Answer: The number of abundance and richness of soil invertebrates showed different changes in different sampling months.

- Line 207:"On the whole, the number of soil fauna groups increased first and then decreased with each month in all the treatments."is this richness?

Answer: On the whole, the richness of soil invertebrates increased first and then decreased with each month in all the treatments.

- Line 211:"During the 5months of the study, the individual number of soil fauna showed a trend..."is this abundance?

Answer: During the five months of the study, the abundance number of soil invertebrates showed a trend

- Line 239:"The community characteristics of soil fauna under different treatments are shown in Table 3." Did you consider all fauna collected during the whole study, but per area, to calculate these?

Answer: I had calculate these by collecting all fauna in each area.

- Line 269:"Astigmata □ Folsomia □ Actinedida"

Answer: *Astigmata*, *Folsomia*, Actinedida...

- 3 How did you select these morphospecies? Or did you use all of them and only plotted significant ones?

Answer: A redundancy analysis (RDA) between soil organic carbon composition and dominant and common groups of soil fauna.

- Line 292:"Soil fauna are consumers and decomposers"not only

Answer: Most soil fauna are consumers and decomposers of farmland ecosystem,

- Line 305:"which effectively reduced the evaporation of soil water, slowed down the change of soil temperature, and provided a good habitat for soil fauna"can you say this without measuring?

Answer: this has been removed.

- Line 320:"nail"?

Answer: oribatid mites

- Line 325:"This may be because animal manure provided rich organic materials for Oribatida, promoted the growth and reproduction of Oribatida, and thus increased their number."Oribatids are mostly fungi feeders. This link is not direct, rather through bottom up effects on microbial communities

Answer: Oribatids are mostly fungi feeders, and animal manure provided rich nutrients for soil fungi, thus promoted the growth and reproduction of Oribatida and increasing the number of Oribatida.

- Line 350:"In this study, Shannon-Wiener index, Pielou index, Margalef index and Simpson index of soil fauna community were changed by straw and animal manure combined application"This is overwhelming and you likely won't need those many indexes besides richness and abundance.

Answer: this has been removed.

- Line 359:"higher in July, which was mainly caused by the higher number of Oribatida" check for oribatida seasonal fluctuations.

Answer: the number of oribatida was higher in summer.

- Line 383:"humus and fungi and is sensitive to soil nutrients and pH" Consider: https://www.biotaxa.org/saa/article/view/saa.26.5.4

Answer: Barreto, C., Lindo, Z.: Checklist of oribatid mites (Acari: Oribatida) from two contrasting boreal fens: an update on oribatid mites of Canadian peatlands [J], Syst. Appl. Acarol-uk, 26, 5, https://doi.org/10.11158/saa.26.5.4, 2021.

- Conclusion: ok, so you compared the effects of diff manure to soil fauna. But you're missing the link between diversity and BEF. Are high numbers always an advantage?

Answer: This shows that improving richness and abundance of soil invertebrates through the application of organic wastes. The results of this study may help to alleviate the shortcomings of the traditional modes of straw application and also provide a reference for straw and animal manure management. Further research should characterize the link between diversity of soil invertebrates and BEF after the application of animal manure and straw.

Please also note the supplement to this comment:
https://soil.copernicus.org/preprints/soil-2021-132/soil-2021-132-AC1-supplement.pdf