The manuscript titled "Drivers and assemblies of soil eukaryotic microbes among different revegetation types in a semi-arid mountain in China" investigated the effect of different plant species used in soil restoration efforts at a site south of the Taihang Mountains in China, of semi-arid climate.

General comments

This work needs to be improved and a research hypothesis has to be included before publication. For further explanation, see specific comments below:

Abstract

Line 15: explain what would be meant by diversity and abundance

Line 19: why such comparison between protozoa and fungi? It is not clear the purpose of it

Introduction

Line 27: better specify to what is refer in the following sentence "Eukaryotic microorganisms are the dominant form of life" It this referred to biomass?

Line 30: revise the use of the word humus. In the context of the text it would be better to use the term organic matter. See article by Cotrufo et al 2015. Nature Geoscience for more insight into organic matter formation

Line 40: both articles sited took place in aquifer environments, this should be stated in the text to give an environmental context and contrast to the manuscript

Lines 40-42: in the text it is mentioned several studies have reported effects of organic fertilizers on eukaryotic communities. However, only one article has been cited.

Lines 44: what is sandtone 8?

Lack of hypothesis: this manuscript does not propose a hypothesis to test

Discussion

Lines 234-236: it is not clear what is the point of this sentence

Lines 237-238: this sentence is vague

Lines 258-262: it is not clear the connection of this statement with the discussion provided above in the same paragraph

Lines 269-272: what do the authors mean by "single OTUs"? are these singletons? If so, I would

recommend removing these from the data set. Reasons on doing so are explained in the SOP by Schloss et al 2009

Lines 284-287: is this humus layer (see comment on terminology) present only in the forest soil? If so, this should be clearly explained starting from the methodology

Basic Reporting

Introduction

Lines 42-45: this text is not clear

Lines 73-74: revise text, does not flow well from the text before

Line 80: revise the use of the connector However

Literature: about 40% of the articles cited are older than 2008. It is important to report newer and updated research reports

Materials and Methods

Lines 108-111: what is the purpose of this text? Is not connected with the rest of the paragraph

Line 124: regarding figure S1, are the authors of this article the creators of the image? Also, the legend description is poorly descriptive. Moreover, in the figure there are two soil depths shown and, in the methodology, only one is mentioned

Line 150: check xxtraction misspelling in legend for table S1

Line 155: check reference format

Results

Lines 184-185: revise the text regarding OTU, it is not clear and does not flow well

Line 193: regarding table 2, revise number of decimals reported. Be consistent on the number of decimals reported for each metric

Discussion

Line 263: check the use of the word however

Figures and Tables

Table 1: revise superscript in data units

Table 2: use a more descriptive table legend

Figure S1: improve quality of soil profile figure and state the authorship. Clarify the sampling depth shown in the figure and that expressed in methodology

Table S1: revise typo in the legend

Table S3: explain what is meant by indicator species analysis

Experimental design

Materials and Methods

Lines 93-95: if climatic conditions are provided, precipitation should be also included. This data is especially relevant given the climatic context of this work

Line 95: soil classification does not follow the nomenclature used by the USA Soil Taxonomy classification system, please revise and correct

Line 113: only one sampling depth is mentioned. It is not clear how this sampling strategy is related to the humus layer (see comment on the use of this terminology). This needs to be clarified, as it has implications on results such as that provided in Figure 4

Lines 123-124: explain this method better. How could you get water content from a dry sample?

Line 125: revise the use of the term humus layer. This terminology is not technically correct. Are you specifically referring to an O horizon or rather generalizing about a surface layer enriched in organic matter? I strongly suggest the correct use of edaphic terms

Lines 128-132: what was the area and soil depth for root sampling?

Line 156: what does PE stand for?

Validity of the findings

Results

Lines 193-195: text regarding indicator species analysis is not clear. This sentence is not informative

Lines 217-220: the text regarding network analysis does not add information to that already inferred from Venn diagrams

Discussion

Lines 238-340: this result is somehow expected, results should be more elaborated

Lines 247-250: same as comment above

Conclusions

Conclusion does not add novelty and it seems to be merely an abstract of the results presented through the text

<u>Confidential notes to the editor</u>

The manuscript is overall well structured; however, it does not add value to the current scientific knowledge on the subject. It is possible to thoroughly work in the interpretation of results and implications, so the manuscript could be improved and resubmitted.

It is not clear the authorship of the figures, regardless, it is of extremely poor quality for a publication in this journal.