

Review of the paper "Effects of fertilizer application patterns on foxtail millet root morphological construction and yield formation during reproductive stage on the Loess Plateau of China"

This study aimed to evaluate the effects of different fertilizer application patterns on foxtail millet root growth, yield, and water use efficiency. The research was conducted in 2017-2018 in a semi-arid region of Northern China. Five fertilizer treatments were tested, including inorganic nitrogen and phosphorus fertilizers alone or in combination with organic manure or microbial fertilizers. Data was collected on root morphology indicators, yield components, and water use at different crop growth stages. Results showed the integrated application of inorganic and organic fertilizers significantly enhanced root length, surface area, volume, and diameter compared to inorganic fertilizers alone. The root growth improvements were correlated with higher grain yield and water use efficiency. In particular, balanced application of inorganic nitrogen and phosphorus with organic manure promoted optimal root development and increased yield stability. This study demonstrates that tailored organic-inorganic fertilization can boost foxtail millet productivity in water-limited regions by stimulating root growth and resource capture. Having read this paper, I have some comments below:

Abstract: The abstract provides a concise summary of the key aspects of the study, including the objectives, methods, main findings, and conclusions. Overall, the abstract is well-written. However, the abbreviations of treatments should be identified before using them as they may confuse the reader.

Lines 72-77: The introduction could provide more details on the crop traits and environmental limitations affecting foxtail millet productivity to better set up the context.

Line 120: : **more than 12%**, please be precise.

125: what do you mean by 20 billion/g, please describe the microbial manure. Is it solid?

Line 126: what do you mean by solve potassium?

Line 126: Please justify why did you use bacteria that fix nitrogen, dissolve phosphorus and potassium while you added soluble inorganic fertilizer of NPK. I think the mineral fertilizer will defiantly inhibit the bacterial effects.

128: please justify the selected application rates of different fertilizers you used in the experimental work. Why did you use 5 kg/ha of microbial manure?

Lines 129-133: The methods section on experimental design and crop management lacks some details and could be expanded.

Line: 139-144: please re-write this section again to be more understandable. "Finally, the foxtail millet is harvested uniformly when it is fertilizer"... what do you mean?

Line 144: kg ha⁻², please re-visit

Lines 151-153: More information is needed on the root washing method and storage conditions before analysis.

Line 127-133: The subsection on experimental design and management could be organized more clearly into separate paragraphs on field preparation, treatment application, crop management, data collection.

Line 151-162: Consider organizing the root data collection and analysis methods into separate paragraphs for clarity.

Lines 163-170: The yield and yield component data collection requires more details on sampling and measurements.

Lines 257-263: The results for root biomass effects are unclear and could be presented more effectively.

Lines 364-371: The discussion could be expanded to interpret the differences in root responses between fertilizer treatments.

Lines 372-385: The limitations of the study duration and scope should be acknowledged.

Lines 386-391: The conclusion highlights yield benefits but does not summarize key findings on root growth effects.