Comments to the Author:

This study aims to examine 38-year fertilization experiments under 5 fertilizer treatments were conducted to determine their effects on P pool accumulation, soil microbial communities, and phosphate solubilizing microorganisms (PSM) in paddy soils. Authors claimed that different fertilizer management could affect P species, wherein inorganic fertilizer treatments increased inorganic and available P concentrations. However, organic fertilizer treatments increased organic P concentrations, microbial biomass P contents, and alkaline phosphatase activity. Additionally, this study demonstrated that the compositions of PSM also related to different fertilizer managements. Inorganic fertilization increased the abundance of Thiobacillus whereas organic fertilization raised the abundance of Flavobacterium, Aspergillus, and Trichoderma. This study provided sufficient and sophisticated data. However, some technical errors such as some unit formats should modify throughout this manuscript. This manuscript also needs to be edited for the sentence construction. Collectively, I recommend the publication of this study after a minor revision. Few specific comments were given below.

Response: ***Thanks for your constructive suggestions on our paper. We have revised the paper according to your suggestions. A detailed explanation of the revision follows below.***

Comment # 1:

Abstract: The scientific significant should mentioned in the abstract rather than merely state the results. Abstract should emphasize the significance of the work and state the purpose, the main findings of this work.

Response: ***Thanks for your suggestion. We have revised the Abstract accordingly.***

Line 21-23： ***Understanding soil P transformation and turnover under various fertilization managements is important for evaluating sustainable P fertility and potential bioavailability in agriculture managements.***

Line 40-42： ***These findings are beneficial for understanding the variation of inorganic and organic P pool, and microbial community especially for PSM under long-term inorganic and/or organic fertilization.***

Comment # 2:

Line 26-27: Please change mg/L to mg L^{-1}.

Response: ***Revised as suggested.***

Comment # 3:

Materials and methods: Line 101: 0-20 cm?

Response: ***Yes, the sampling depth is 0-20 cm. We have revised it in the manuscript.***

Comment # 4:

Line 103-104: Please provide detail methods for collecting the rhizosphere soil.

Response: ***We have provided detail methods for collecting the rhizosphere soil in Line 111-113.***

Line 111-113: ***Besides, before the rhizosphere soil collection, the bulk soil was manually removed, and approximately 1 mm of soil on the rice roots was collected as rhizosphere soil (Shao et al., 2021).***

Comment # 5:

Line 110-111: Please provide methods for soil organic carbon measurement.

Response: ***Revised as suggested in Line 119-122.***

Line 119-122: ***Total carbon (TC), organic carbon (OC), and total nitrogen (TN) were determined by CHNS elemental analyzer (Vario EL Cube manufactured by Elementar, Germany) (Schumacher, 2002). The soil was pretreated by 1M HCl with soil-liquid ratio of 1:1 before OC determination.***

Comment # 6:

Line 117-118: Please confirm the extraction method of acidic soil available P was referred to the Bray No.1.

Response: ***The extraction method of available P in this study was referred to Olsen method, because according to the previous studies, the Olsen method could be useful in both acidic and alkaline soil, and was able to explain P status in acidic soil (Shao et al., 2017; Jordan-Meille et al., 2012).***

Comment # 7:

Results:

Line 209, 216, and 217: mg kg^{-1}.

Response: ***Revised as suggested.***

Comment # 8:

Discussion:

I suggest authors could provide important diagrammatic sketch for this study.

Response: ***Thanks for your suggestion. We have added a diagrammatic sketch as suggested.***

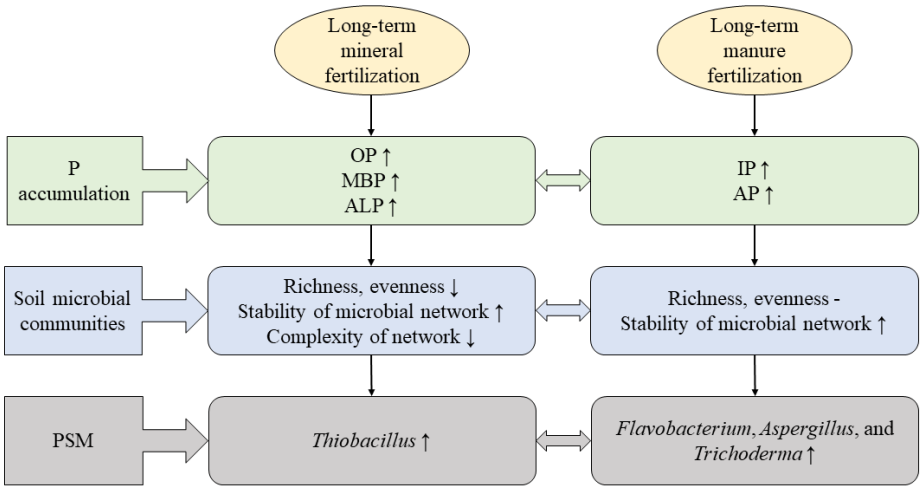

Fig. 8 A diagrammatic sketch showing different responses of P accumulation, soil microbial communities and the PSM after long-term mineral or manure fertilization. ↑, increase; -, no effect; ↓, decrease.

Reference

Jordan-Meille, L., Rubæk, G. H., Ehlert, P. A. I., Genot, V., Hofman, G., Goulding, K., Recknagel, J., Provolo, G., and Barraclough, P.: An overview of fertilizer-P recommendations in Europe: soil testing, calibration and fertilizer recommendations, Soil Use and Management, 28, 419-435, https://doi.org/10.1111/j.1475-2743.2012.00453.x, 2012.

Shao, X., Zhang, J., and Guo, L.: Assessing the Feasibility of Olsen P and P Sorption Parameters in Acidic Soils, Communications in Soil Science and Plant Analysis, 48, 2049-2060, https://doi.org/10.1080/00103624.2017.1406101, 2017.