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Effects of supplying silicon nutrient on utilization rate of nitrogen and phosphorus nutrients by rice and its soil ecological mechanism in a hybrid rice double-cropping system

Key words: Silicon nutrient, Utilization rate of fertilizer, Ecological mechanism, Rice double-cropping system

Research Summary

This research article focused on the effects of supplying silicon nutrient on utilization rate of nitrogen and phosphorus nutrients by rice and its soil ecological mechanism in a hybrid rice double-cropping system.

- Effects of supplying silicon nutrient on growth and yield of rice**
- Effects of supplying silicon nutrient on N and P nutrient uptake from soil and N and P utilization rates from fertilizer**
- Effects of supplying silicon nutrient on availability of soil N and P nutrients**
- Effects of supplying silicon nutrient on soil microbial biomass C, N, and P**
- The relationship between grain yield and N and P use efficiency of fertilizer, mineralization of soil N and P nutrients, and the reserves of organic N and P nutrients in microorganism**

Innovation points

- **Introduction** of an essential function for silicon (Si) in promoting biomass production and grain yield of plant and enhancing tolerance of plant to various abiotic and biotic.
- **Summary** of the effects of Si application on nutrient utilization efficiency by rice, and on soil nutrient availability and soil microorganisms in a hybrid rice double-cropping planting system.
- **Emphasis** of the ecological mechanism for Si application enhancing rice growth and increasing the utilization rate.

Innovation points

A series of comprehensive tables were generated to summarize the effects of supplying silicon nutrient on utilization rate of nitrogen and phosphorus nutrients by rice and its soil ecological mechanism in a hybrid rice double-cropping system.

Table 1 | Effects of different levels of Si nutrient application on growth and yield of rice.

Table 2 | Effects of different levels of Si nutrient application on N and P nutrient uptake from soil and N and P utilization rates of fertilizer by rice.

Table 3 | Effects of different levels of Si nutrient application on mineralization of soil N and P nutrients in a hybrid rice double-cropping system.

Table 4 | Effects of different levels of Si nutrient application on soil microbial biomass C(MBC), N(MBN), P(MBP) at the tiller stage of rice.

Table 5 | Coefficients (r) of correlation between grain yield and N and P use efficiency of fertilizer, mineralization of soil N and P nutrients, and the reserves of organic N and P nutrients in a hybrid rice double-cropping system.

Table 6 | Coefficients (r) of correlation between the reserves of organic N and P nutrients and mineralization of soil N and P nutrients in a hybrid rice double-cropping system at the tiller stage.