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Measuring plant-available silicon in rice paddies

February 26, 2020



Color development due to increasing Si concentrations in the molybdate blue method for analyzing monomeric silicic acid. Photo courtesy of Matt Limmer.

Rice accumulates more silicon than any other nutrient in its tissues, which functions to protect the plant from a variety of stressors. Despite silicon's abundance in soil, most is usually unavailable to the plant. Measuring the amount of plant-available silicon is crucial to determine if a field could benefit from silicon fertilizer, but these measurements can be biased by soil type, the use of silicon fertilizers, and the extent of flooding in the rice paddies.

In a recent article published in the *Soil Science Society of America Journal*, researchers conducted a multi-year study of rice paddies subjected to different silicon fertilizers, including chemical fertilizers and silicon-rich rice husks, and operated under varying degrees of flooding. The team examined correlations between plant silicon concentrations and several soil silicon extraction methods.

The researchers found that a dilute calcium chloride extraction for 4 or 16 hours best predicted plant silicon concentrations irrespective of management. Other extractants were positively correlated with plant silicon but biased the amount of plant-available silicon when a silicate fertilizer was present.

Any fertilizer recommendation can be improved with the use of robust soil testing. This work moves the rice community closer toward robust plant-available silicon soil testing.

Dig Deeper

Wu, W., Limmer, M.A., and Seyfferth, A.L. (2020). Quantitative assessment of plant-available silicon extraction methods in rice paddy soil under different management. *Soil Science Society of America Journal*, *84*.

https://doi.org/10.1002/saj2.20013

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