COTTON LEAF MN CONCENTRATION AND LINT YIELD IN ACIDIC SOILS

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Abstract

Low soil pH is a common occurrence in cultivated soils in the South and Southeast. Fertilizing these soils with synthetic N fertilizers further acidifies the soil. Liming is the most commonly, if not the only, recommended remedy of negative effects of acidic soils. Laboratories that analyze soil samples routinely recommend lime application to remediate tissue Mn elevation and other negative effects of low soil pH on cotton production. Although not known as liming material, poultry litter (PL) in the past decade or two has been shown to increase or maintain soil pH. This study tested whether the level of cotton leaf Mn can be lowered, and its lint yield-lowering effects can be reduced in a low pH soil. Cotton was fertilized with PL and recommended synthetic fertilizers with or without lime during the 2019 and 2020 growing seasons. Soil pH, leaf MN concentration, and lint yield were determined each year. The result showed that liming increased soil pH and effectively lowered leaf Mn levels by as much as 38% for the synthetic fertilizer treatment. This desirable effect, however, did not improve cotton lint yield. Fertilizing cotton in this soil with PL without liming increased lint yield by as much 68% over the cotton fertilized with synthetic fertilizers with lime. The large lint yield advantage of PL fertilization does not seem to be related to tissue Mn concentration as the differences in leaf Mn existed between the PL and standard fertilization treatments was modest. The large yield differences between these two fertilized treatments rather seems related to mineral nutrition, K in particular. The results overall show that liming may not be necessary if fertilizing acidic soils with PL.