Dynamics of Plant Response to Manganese Toxicity: Its Use in Managing Excess Manganese in Acid Soils. (S04-bajita153220-Poster)

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Abstract:

Manganese phytotoxicity is a dynamic process involving feedback between plant growth and Mn uptake. Understanding this dynamics is useful in managing excess Mn in acid soils. We grew soybean cv. Lee and Forrest in pots using a high-Mn Oxisol. Five growth conditions were imposed: control (field capacity), dry soil (80% field capacity), green manure, high P, and shading. Lee exhibited tolerance for high Mn with fewer brown spots, less crinkling and larger plants than Forrest regardless of similar tissue Mn. Shading, dry soil and high P alleviated toxicity symptoms while green manure aggravated them. Dry soil led to lower rates of transpiration and assimilation, but similar growth rate and tissue Mn as the control. Assimilation was lower and transpiration was higher under shading, but growth rate and tissue Mn were similar with the control. Green manure and P increased leaf Mn, but with P, high rates of growth, assimilation and transpiration were maintained. We conclude that Mn phytotoxicity is correlated with rates of water use and growth; and that its dynamics is characterized by a positive feedback of growth on leaf Mn and a negative feedback of leaf Mn on growth.

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