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Nutrient management of soybean in the Brazilian Cerrado

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Favorable landscape and climatic conditions, genetic improvement, adoption of technology, and intensive farmer effort have all contributed to the success of soybean production in the Midwest of Brazil. Cerrado soils are known to be poor fertile: low in P and K and acidic. Therefore, the first ameliorations required are liming to correct acidity (pH around 5.5) and apply phosphorus and potassium fertilizers to achieve good yields. Average rates are 35-40 kg P/ha and 75 kg K/ha. *Phosphogypsum* application (1 t/ha) is currently well adopted to minimize Al toxicity and supply S to plants. In past years, there has been a large-scale adoption of broadcasting P fertilizers associated with the need to speed up the seeding process due to changes in the production systems (i.e., relying on early seeding dates and harvesting as a way to escape Asian Rust) and also, to increase the area available for a maize second crop. Studies have shown high-yielding soybean with the broadcasting of soluble P fertilizers, while others emphasized caution since (i) even in high fertility soils banded application has shown yield increases compared to broadcast application, and (ii) continuous broadcast application of P fertilizer in no-till systems will lead to the formation of a gradient of available soil P within the profile. Nitrogen is mostly supplied by biological fixation coming from well-developed inoculants, but high soil temperatures may largely impact BNF, especially in sandy soils. Therefore, cover crops residues help to regulate temperatures and favor BNF. The nutrient budget study done by IPNI in Brazil have shown removal-to-use ratios of 0.50 for P and 0.99 for K. Micronutrients foliar applications are in average: 350 g Mn/ha, 2.5 g Co/ha, and 25 g Mo/ha.