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INFORMATION**

PHOSPHORUS FERTILITY FOR SOYBEANS FACT SHEET

This is one in a series of fact sheets from the Mississippi Soybean Promotion Board and the soybean checkoff. Each sheet presents a brief overview of a topic important to Mississippi soybean production. More information on each topic can be accessed through the link at the bottom of the sheet. To see other fact sheets, click [here](#).

Phosphorus (P) is an essential nutrient for plant growth, and is categorized as a macronutrient for crop production. Phosphorus exists in soils in both organic and inorganic forms. Phosphorus in organic materials is released in processes that involve soil organisms, but the amount of P released this way contributes only a small amount of plant-available P. Inorganic P availability to plants is influenced by soil pH, with optimal availability at pH values between 6 and 7. At pH's below 6, plant-available P is increasingly tied up in aluminum and iron phosphates. At pH's above about 7.3, P is made unavailable by fixation in calcium phosphate. Thus, availability of both soil and fertilizer P is tied to soil pH.

Soybeans remove approximately 0.90 lb of phosphate (P_2O_5) or about 0.40 lb of actual P for each bushel of harvested seed. On most fields, at least this removed amount of P should be replaced to maintain adequate P fertility.

The need for P fertilization should be based on soil test recommendations. Soil testing measures the ability of a soil to provide P to the soil solution for plant use; i.e., it does not measure the total quantity of available P. Thus, soil test results provide an index of P in the tested soil that is related to the fertilizer needs of the planned crop.

Indices provided by the MSU Extension Service Soil Testing Laboratory for all crops are: 0-18 lb/acre soil test P—very low index value; 19-36 lb/acre soil test P—low index value; 37-72 lb/acre soil test P—medium index value; 73-144 lb/acre soil test P—high index value; >144 lb/acre soil test P—very high index value.

In general, no P fertilization is recommended for soils testing in the high or very high index categories. For soils testing in the medium, low, and very low categories, the recommended P_2O_5 fertilizer rate is 30, 60, and 120 lb/acre.

Since soils in the Delta usually are in the high or very high categories, P fertilization is rarely required for these sites.

Because P fertilization is not required every year, it is most economical to apply an ammoniated material ahead of the corn crop in a biennial soybean-corn rotation.

Growers can select from straight P materials such as triple superphosphate or from liquid or dry formulations of ammoniated phosphates. Common P-containing fertilizers are: ammonium polyphosphate, 35 or 62% P_2O_5 ; diammonium phosphate, 46% P_2O_5 ; monoammonium phosphate, 48% P_2O_5 ; ordinary superphosphate, 20% P_2O_5 ; triple superphosphate, 46% P_2O_5 .

Leaf tissue testing is the best method to accurately diagnose P deficiency early in the season. However, the problem likely cannot be corrected until the next season when fertilizer input can be adjusted to account for the deficiency.

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