

# Available Nutrients Impact Soybean Health

DR. ALLEN WRATHER

---

PORTAGEVILLE, MO.

Plant growth and yield are dependent on available nutrients in the soil such as nitrogen, phosphorus, potassium, calcium, sulfur and others. A balance among these is also important. For example, a deficiency of sulfur in the soil will interfere with wheat utilization of nitrogen.

Nutrients in the soil can also impact plant resistance to some diseases. We learned that late season leaf spot diseases of cotton will be more severe if potassium levels in the soil are less than needed by the plant. These diseases can be prevented next year by simple addition of potassium to the soil before the next crop. Wilt diseases of cotton will also be worse if potassium levels in the soil are lower than needed by the plant. There is some evidence that soybean root rot caused by *Rhizoctonia* will be worse in fields with insufficient levels of potassium, and addition of potassium will result in less root rot. Addition of nutrients will not always result in greater plant resistance to diseases. We learned that addition of potassium to soil that had less than needed by soybean resulted in increased growth and yield, but the plants resistance to soybean cyst nematode was not increased. Unfortunately, little is known about the impact of

availability soil nutrients such as phosphorus on soybean resistance to other diseases in Missouri. Soybean yield has been most suppressed in Missouri each year by soybean cyst nematode followed by *Phytophthora* root rot, seedling diseases, and sudden death syndrome. Our objective is to evaluate the impact of available levels of phosphorus in soil on soybean resistance to diseases that may develop in southwest Missouri. Our field trials are conducted there because levels of phosphorus in soil there are very low compared to southeast Missouri. We think application of phosphorus to soil there will result in better yielding soybean that are more healthy compared to soil that was not treated, but we must wait to see the test results.

Farmers should test multiple samples of soil from each field every 3 to 5 years and apply recommended rates of nutrients for best yield. These recommended rates are based on years of research in Missouri and will only be changed when data are available to justify it either for best yield or for best disease management. Until then, farmers should apply needed fertilizer, rotate crops, plant resistant varieties, and use fungicides for best plant growth, yield and disease management. Δ

DR. ALLEN WRATHER: Professor, University of Missouri