



Most Asked Agronomic Questions

Bulletin 760

Chapter 4

Phosphorus and Potassium

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1. Please explain the relationship of total soil phosphorus to available phosphorus and P_2O_5 .

The "available soil phosphorus" is related to the Bray P_1 test. This test is a relative index of the amount of phosphorus that the plant is likely to have available for uptake. The "total soil phosphorus" is usually much higher than the available index because it also includes the mineral and organic phosphorus of the soil.

The P content of fertilizer is expressed as the percentage of available P in terms of P_2O_5 . Every pound of P_2O_5 contains 0.44 pounds of available P.

2. Why is the buildup of phosphorus slow?

On average, 10 units (lbs) of P_2O_5 fertilizer are required to raise the P soil test value one unit (lb.) Thus, unless you add excessive amounts of phosphorus fertilizer, the buildup of soil phosphorus is always a very slow process.

3. What forms of phosphorus are the best buy?

Research has shown that the various forms (carriers) of phosphorus react similarly when they are applied to soil; therefore, the best fertilizer buy is simply the least expensive per pound of phosphorus.

4. When is the phosphorus level too high?

The phosphorus level of the soil is considered "too high" if it interferes with the uptake of other essential elements. Zinc is usually the first element to have restricted uptake when soil P becomes high. This effect on Zn uptake is pH dependent: the higher the pH, the worse the problem becomes. As a general rule of thumb, the P level of soils with pHs greater than 6.5 should not exceed 60-90 pounds Bray P_1 per acre.

5. When white potash is spread on a field, you can't see it after a few hours, but red potash is

visible all day. Is this observation significant?

No. This observation has no agronomic significance in terms of crop response to added K. Red potash obtains its color from a relatively insoluble iron coating; the potash itself (KCl) is just as soluble as white potash.

6. Vegetable growers prefer white potash because they feel it gives a healthier plant and a higher quality produce. Does research back this up?

Research indicates that agronomically there is no difference in plant response to red and white potash. Both contain the same active ingredient, KCl, and thus would be expected to give similar results.

7. White potash has a sodium level of approximately 1% and red potash approximately 4%. Does this affect crop production?

These differing amounts of sodium should not affect crop production. Sodium is an element that is non-essential for plant growth. Small quantities of sodium appear to have no effect on yield.

8. Are there potential buildup dangers with the continued use of chloride-based fertilizers?

Salt buildup is usually not a problem on humid Midwest soils having CECs greater than 5. Typically, these soils can tolerate annual applications of 250 pounds Cl per year (500 lbs. KCl/year) without risk of chloride buildup.

Reference: Diagnosis and Improvement of Saline and Alkali Soils, U.S. Dept. of Agriculture, Agricultural Handbook #60.

9. We decrease yields when we apply high rates (120-150 lbs.) of K in the spring with herbicides. We have read about the Cl effect on soybeans. Could this be the problem? Would Ridomil help alleviate this?

Although some Cl is required for optimum growth, very high levels of it can cause problems to occur. There is evidence that adding Cl to some soils can stimulate plant growth; other research has suggested that Cl additions will decrease growth. The only evidence that has associated decreased growth of soybeans with Cl was obtained from research conducted at very high levels of Cl.

Cl buildup in the soil can result in salt damage to plants; this is often manifested in root injury and subsequent fungal diseases. If the decrease in yield is due to a disease that Ridomil has activity on, use of this product may prove beneficial. Ridomil, however, does not have any direct effect on the Cl concentration in the soil.

10. Are wood ashes useful as a K fertilizer?

Wood ashes are relatively high in potassium. If used in low or moderate rates, they can be good sources of this nutrient. Wood ashes are also high in several other salt products. For this reason, high application rates should be avoided as salt problems may occur.

11. How much potash to apply for soybeans and when? Does an annual application of potassium pay in soybeans or can I put it on with corn the previous year?

The desired rate of potash application is dependent on three principal factors: soil test value for potassium (lb. K/A), yield goal, and the CEC of the soil. Refer to Table 19, page 14 of *Tri State Fertilizer*

Recommendations for Corn, Soybeans, Wheat & Alfalfa, Ext. Bull E-2567, for recommended rates of potassium application for soybeans.

Soybeans seem to be relatively insensitive to the time of year of potassium application. We have found only a small advantage (approximately 1 bu/A) to spring application of potash as compared to a fall application. Research has shown that a direct application of potash to soybeans has a slight advantage over applying it the previous year to corn.

Reference: "Response of Soybeans to Added Potassium" 1976 *Soil Fertility Research Progress Report*.

[Back](#) | [Forward](#) | [Table of Contents](#)