

NEWS & VIEWS

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Too Many Phosphorus and Potassium Deficient Soils in the West

GROWERS in the west are adept at producing high yielding and nutritious crops. The foundation for such production is a great climate and fertile soil. We can't do anything about the climate (other than irrigate), but when the native fertility of a particular nutrient is mined to a deficient level by repeated harvests, then growers supplement with fertilizer to maintain yields, and better yet, to increase them. However, a recent survey by the Potash & Phosphate Institute of more than 1.8 million soil samples taken in the fall of 1996 and spring of 1997 across North America revealed that many fields are being under-fertilized, including those in the western U.S.

The information collected from both public and private laboratories is reported as percent of soil samples that tested low (deficient) or medium (marginal) in available phosphorus (P) or potassium (K) and had pH values below or equal to 6.0. At these soil test categories, most agronomists would expect to see a yield response to the application of P, K or lime. Fertilization of these fields with P or K has been barely adequate or is inadequate...where increasing use above current levels will very likely increase long-term profitability by building soil fertility to a more optimum level.

Admittedly, the survey has some weaknesses:

- The agronomic definition of medium is not consistent among laboratories, but varies based on individual laboratory approaches to fertilizer recommendations.
- Quantity of samples was low in some states and provinces.
- Some areas within a state or province are likely under- or over-represented.

- Home and garden samples frequently could not be separated from agricultural samples, contributing to a bias (they tend to be more fertile).
- A sample representing one acre has the same weight as one representing 100 acres.

Despite these weaknesses we can still make some useful observations. The most important observation is that growers are experiencing a lot of lost opportunity (reduced yields, lower quality) because of inadequate fertilizer practices...such as rates too low to re-supply P or K removed with harvest or simply the wrong nutrients applied or in the wrong balance.

The information for P is presented in **Figure 1**. Only the state of Washington in the west has less than 30 percent of the samples that tested in the low or medium category. But whether it is one field in five or one field in three, it is too many. These growers are operating on the edge where they can not take advantage of an exceptional growing season and where an unexpected stress will reduce yields more than necessary.

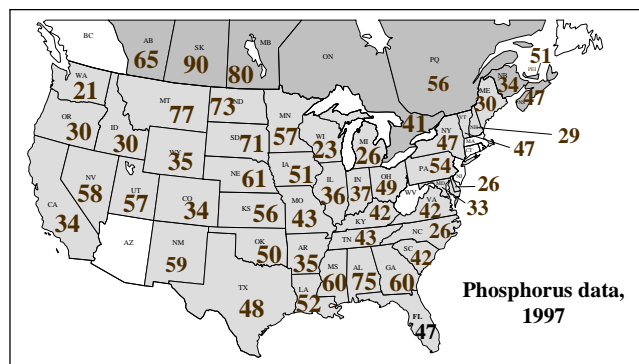


Figure 1. Percent of soils testing medium or lower in phosphorus.



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The situation is similar for K, but not to the same magnitude as P. Samples from most of the western states ranged from 10 to 20 percent testing low or medium. The notable exception is California with 48 percent (see **Figure 2**). This value seems high (and very well may be for reasons listed above). None-the-less, even at half this value ...which would put it into the ballpark with neighboring states...it still represents a lot of fields (one out of four) that are deficient or marginal in K fertility. Only in the last few decades have we documented widespread K deficiencies in some western areas. The data from this survey suggest that growers need to be reminded to watch their K levels. After all, crops remove quantities of K similar to nitrogen (N).

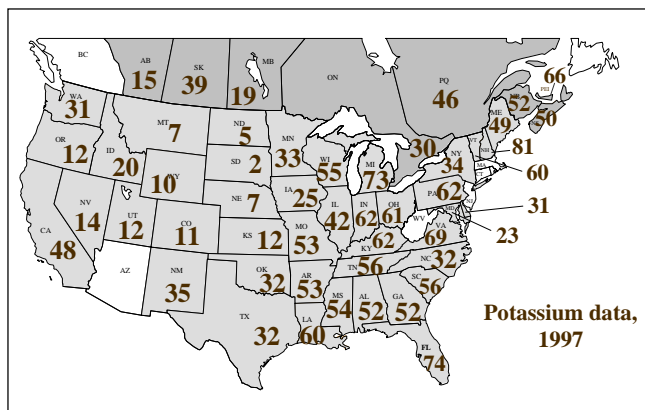


Figure 2. Percent of soils testing medium or lower in potassium.

Liming to neutralize soil acidity is an important agronomic practice for high yield production. This is a minor concern in most western states, although California,

Oregon and Washington have 11 to 27 percent of their samples testing at or below pH 6.0 (see **Figure 3**). Soils in high rainfall areas tend to be acid, and fertilizing with acid forming fertilizers, especially on sandy soils, promotes acidification. Liming to maintain soil pH near 6.5 promotes fixation of N by legumes, improves the availability of P and other nutrients and lowers the potential toxicity of aluminum (Al) and manganese (Mn).

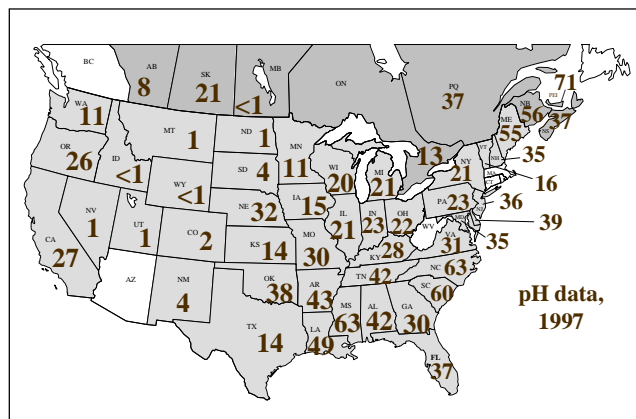


Figure 3. Percent of soils testing 6.0 pH or less.

There seems to be a perception in the west that N is the key plant nutrient. Important, yes. But the above summary clearly indicates that many fields are low (deficient) or medium (marginal) in both P and K...some even need lime. (What's the west coming to?) At any rate, growers need to think in terms of a full fertilizer program, utilizing soil and tissue testing as guides, and managing all three major nutrients...N, P and K...for optimum high yield production. ■

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