

Can I Skip P And/Or K Fertilizer Applications For A Year?

COLUMBIA, MO.

Whenever fertilizer prices spike higher a common question is "Can I safely take a year off fertilizer P and K applications?" The quick answer is that if maintain your soil test levels at or above MU target levels there is little risk of yield loss from taking one year off fertilizer applications.

To understand why requires understanding the details of how phosphorus and potassium fertilizer recommendations are developed. The first piece of information needed to answer this question is how much phosphate and potash are extracted from the soil by a crop. I am going to work with corn as the example crop. A yield goal of 200 bushels per acre is greater than or equal to yield goals for corn for most of Missouri. Two hundred bushels of corn removes 70 lb. of phosphate per acre and 50 lb. of potash per acre.

The removal of this phosphate and potash will lower soil test levels in the field:

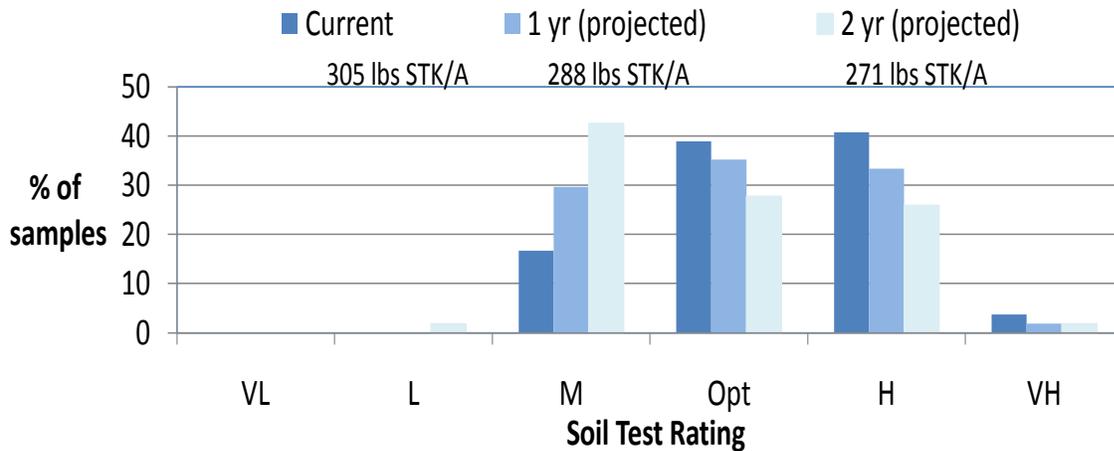
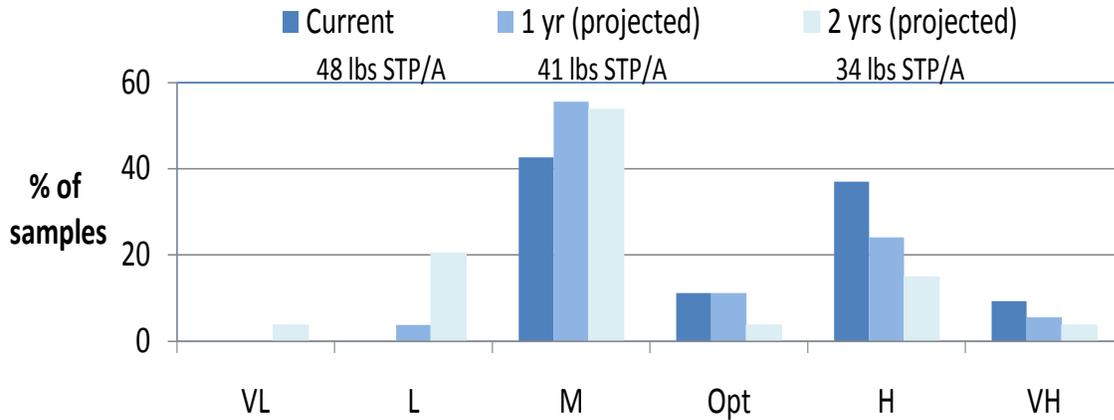
- A "typical" soil changes one pound per acre soil test P with the addition or removal of 10 lb. per acre of phosphate. Removal of 70 lb. per acre of phosphate will lower the soil test level of the field about seven soil test units.
- A "typical" soil changes one pound per acres soil test K with the addition or removal of 3 lb. per acre of potash. Removal of 50 lb. per acre of potash will lower the soil test level of the field about 17 soil test units.

The exact change in soil test levels will depend on soil properties. Clayey soils tend to change less and sandy soils tend to change more with removal of the same amount of P or K.

In Missouri, the target soil test P level is 45 lbs per acre and for K is 265 to 300 lbs per acre. However, a field with this soil test level actually is a mixed bag of soil test levels, with some areas of the field having higher soil test levels and some areas with lower soil test levels.

As an example of this, Figure 1 shows the distribution of soil test levels on a three-acre field at the MU Forage Systems Research Center in Linneus, Missouri. We divided the field into 54 2500-square foot areas and sampled them separately. The mean soil test P level was 48 lbs per acre and soil test K was 305 lbs per acre, both close to optimum. At this soil test level no part of the field was in the very low or low soil test category (see the dark blue bars in Fig. 1). About 60 percent of the field has a soil test level that is at or above optimum level for P and over 80 percent of the field is at or above optimum for K.

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Target soil test levels are set recognizing that this level of variation exists in a field. This leads to setting the target level somewhat higher than what would be needed if the field were more uniform. The target level is set so that probability is low that any part of the field is unlikely to have restricted yield because of low soil test levels.

Figure 1 also shows the projected soil test distribution in the field if no P or K is applied for one or two years. In this example, less than 5 percent of the field moves into the low category for P with one year off from maintenance P applications. For K, it is projected to take two years of no application to lower any part of the field into the low category.

So taking a year off applying maintenance P or K applications will lead to a decrease in soil test level in your field. This drop is unlikely to reduce yield in your field if soil test P and K is at or above current MU targets. Consequently, this can be a reasonable strategy to cope with a short-term upward spike in fertilizer prices.

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