Soil Phosphorus Test

Purpose: Phosphorus plays an important role in plant health and growth; it encourages root development, increases the ratio of grain to straw, and increases resistance to disease, among other things. Some soil phosphorus is in a form available to plants, but much of it is tied up in the organic matter pool, or bound tightly to mineral particles. The soil pH has a large influence on phosphorus availability and solubility. Some prairie soils are quite low in available phosphorus, and more may need to be added for adequate crop growth. However, it can be over-applied in the form of fertilizers, manures, and other forms. Excess phosphorus that is washed into waterways can lead to overgrowth of algae and other microorganisms, depleting oxygen, which results in eutrophication, and fish death. Knowing the level of phosphorus in farmland soil can be very important. This soil test for phosphorus estimates the amount that is available to plants during the upcoming growing season. Commercial soil test labs can report results as available phosphorus, and can also determine the total amount of phosphorus in the soil, including that bound up in the organic matter pool for release later.

Tools: the following procedure used the LaMotte garden soil test kit model EM, Code 5934. Other methods of measuring soil phosphorus are also possible. Some test kits are more accurate than others. Before using a particular “quick test “method, compare it to laboratory results. The tests recommended in this handbook have all been compared to KSU soil test laboratory results, and have been deemed satisfactory for initial screening purposes.

Procedure:

1. Fill the test tube to line 6 with the Phosphorus Extracting Solution*.
2. Use the 0.5 g spoon to add three measures of soil sample.
3. Cap and gently shake for one minute.
4. Remove cap. Allow to stand and soil to settle until liquid above the soil is clear.
5. Use the pipet (dropper with the red bulb) to transfer the clear liquid to a second clean test tube. To avoid agitation of soil squeeze the bulb of the pipet before inserting tip into liquid. Release bulb slowly to draw clear liquid into the dropper. Do not pull up any soil. Fill this second, clean test tube to line 3 with the clarified solution.
6. Add six drops of the Phosphorus Indicator Reagent* to soil extract in the second tube.
7. Cap and shake to mix the contents.
8. Add one phosphorus test tablet.
9. Cap and shake vigorously until the tablet is dissolved. A blue color will develop.
10. Match the test color with the phosphorus color chart. Record this phosphorus level on your data sheet.

	Nitrogen	Phosphorus	Potassium
LaMotte Level:	**Nutrient level range in ppm**		
Low	0-15	0-25	0-60
Medium	15-30	25-50	60-100
High	30+	50+	100+

Interpretation - LaMotte Nutrient Tests (N, P and K): The interpretive guides provided with the kits give results as high, medium or low. Other values are possible, such as zero, trace, medium high, etc. Most commercial soil test labs provide results in units such as lb/a or ppm. Use the following table to convert the LaMotte colormetric values of low, medium, and high to approximate ranges in ppm (parts per million). Then use ppm values to determine if additional nutrition is required for the crop you are growing.

Generally speaking, if a soil falls in the low range for a nutrient, crops will be deficient, and can be improved either in quantity or quality by the supplementation of the deficient nutrient. The medium range is usually an adequate level for most crops. The high range is also adequate for crop growth and yield, and may be necessary for heavy feeding crops such as corn. However, for other crops this could be excessive and could lead to nutrient pollution in surface water run-off.

KSU Extension guidelines vary slightly from the LaMotte table above, with the Horticultural recommendations slanted slightly higher than the table values listed above (need a higher level of each to be in the “medium” and “high” categories). The Agronomy, or field crops recommendations on the other hand, are consistently lower than the LaMotte guidelines. Thus, this table may be used with the caveat to consult KSU publications and expertise for the specific crops you are growin,. However, this table combined with the LaMotte tests can be used to determine if the nutrient levels are about right, or are too high or too low.

Use the following table to score your phosphorus, nitrogen, and potassium test results. A score of 4 is the best rating, 3 is good, 2 is fair, and 1 is poor.

4	3	2	1
Nutrient levels are in the “medium” range.	Nutrient levels slightly above or below “medium.”	Nutrient in question is “low” or “medium low,” and may be deficient.	Nutrient level is “medium high” or higher, and may be contributing to water pollution, even though crop growth is adequate.