

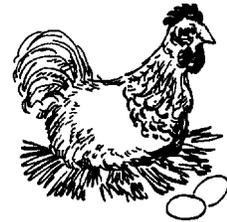


The University of Georgia

**Cooperative Extension Service**

College of Agricultural and Environmental Sciences / Athens, Georgia 30602-4356

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## **COMMERCIAL EGG TIP...**

### **THE PHOSPHOROUS INDEX**

Phosphorous is often the limiting nutrient in fresh (non-salt water) surface waters. Phosphorous enrichment of such waters can lead to increased algal growth and ultimately result in decreased oxygen concentrations and death of aquatic organisms, such as fish. Phosphorous is an essential plant nutrient for forage and crop production and is applied to farm land by means of commercial fertilizers or animal manures. Phosphorous ( $P_2O_5$ ) can build up in soils to the point where tracts of land may become non-point sources for phosphorous contamination of streams, rivers and lakes. The relationship between phosphorous concentrations in soils and risk of water contamination is complex. For nutrient management planning, a simple calculation using the soil test value for  $P_2O_5$  and the agronomic requirement of a particular crop for  $P_2O_5$  will not suffice to determine the actual amount of  $P_2O_5$  that can safely be applied to a field. In some cases, more  $P_2O_5$  could be applied than such a calculation would indicate. A Phosphorous Index (P Index) has been proposed as a tool which would better evaluate the vulnerability of a site to off-site movement of phosphorous.

The USDA Natural Resources Conservation Service (NRCS) has decided to use a P Index in its revised Conservation Practice Standard for Nutrient Management, which it will use for development of nutrient management plans. This P Index would determine if manure application should be based on nitrogen or phosphorous. The NRCS intends to have each state design a P Index best suited for its own circumstances by the end of 2000 to enable the revised Conservation Practice Standard to be implemented by the fall of 2001. The P Index involves qualitative assessment of a site using three groups of criteria; Site Source Characteristics, Site Transport Characteristics, and Best Management Practices.

#### **Site Source Characteristics.**

The total amount of  $P_2O_5$  in a tract of land is the sum of the  $P_2O_5$  already in the soil (Soil Test P) and the amounts of  $P_2O_5$  added by application of commercial fertilizer and manure. Soil Test P, Fertilizer P, and Manure P each have a unique contribution to P in runoff water. They are evaluated separately and each given a numeric rating, often from 0 to 16, where a low value or high value,

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respectively, means low risk or high risk of P contamination of surface waters from that source. The relationship between amount of P in each site source and in runoff water is determined by studies using soil types similar to that of the field being evaluated.

Once the evaluation is done, the ratings for the different source characteristics are summed to produce a single rating value for site source characteristics.

### **Site Transport Characteristics.**

The potential for phosphorous to move offsite is also affected by the amount of water that is likely to flow from the site and the amount of material that is likely to go with it. A P Index, therefore, will evaluate such things as surface runoff class, yearly soil erosion, and leaching potential. Surface runoff can carry solubilized P directly into surface waters. Eroded soil may carry bound phosphorous which may be released after entering surface waters. Leaching potential involves the susceptibility of a soil to percolation of water carrying dissolved P down into ground water which could then move to surface water bodies. The ratings for site transport characteristics are summed to give a composite rating value for the group.

### **Best Management Practices.**

Actions can be taken by a farmer to reduce the likelihood of phosphorous being removed from a site, for instance, maintenance of buffer strips between application sites and surface waters, incorporation of manure into soil, or manure application when there is minimal probability of surface runoff. Such actions are recognized as best management practices (BMP) and represent the third group of criteria for P Index site assessment. Properly implemented BMP's may reduce the rating value for the pertinent site source or site transport characteristic.

The P Index value for a given site is calculated by multiplying the composite ratings for site source and site transport characteristics. This value will indicate if the site has low, medium, high, or very high vulnerability to phosphorous movement from the site. According to the revised NRCS Conservation Practice Standard for Nutrient Management, a high or very high rating would require manure application rates to be based on phosphorous or that no manure be applied at all. Low or medium P Index values would indicate that manure could be applied based on agronomic requirements of crops for nitrogen.

Source:

Cabrera, M., 2000. The Phosphorous Index as a Nutrient Management Tool. 2000 Proceedings of the Southeastern Commercial Egg Producers Forum, May 11-12, Tybee Island, GA.

A. Bruce Webster  
~~Extension Poultry Scientist~~

County Extension Coordinator/Agent

**\*\*Consult with your poultry company representative before making management changes.\*\***

**“Your local County Extension Agent is a source of more information on this subject.”**