



The University of Georgia

Cooperative Extension Service

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

MAY 2004



BROILER TIP...

GEORGIA'S PHOSPHOROUS INDEX FOR BROILER OPERATIONS

Phosphorous is a very important nutrient from an environmental standpoint. It is also the nutrient of greatest concern for protection of Georgia's waters. Loss of P to surface waters is a concern because it can accelerate eutrophication in lakes and streams. The Georgia phosphorous index (P-Index) has recently been developed to take into consideration phosphorous in nutrient management plans. Use of the index is now required by the State of Georgia in the nutrient management planning efforts of broiler operations with a 125,000 bird capacity or greater, known as a broiler concentrated animal feeding operations (CAFO).

The P-index is a tool to assess the risk of applying phosphorous (P) found in broiler litter to Georgia soils. Soil test phosphorous level by itself is not adequate to determine environmental risk. The P-index is a site-specific assessment of the possibility of P loss from agricultural lands to surface waters.

Developed by scientists at the University of Georgia and USDA, the P-Index is a computer-based program that estimates the risk of P loss to surface water by considering the sources of P, the transport mechanisms involved, and appropriate management practices that can reduce P losses. Individual fields are scored as either Low (less than 40 points), Medium (40-75 points), High (76-100 points) or Very High (more than 100 points). In this scoring system, individuals applying broiler litter would develop or maintain management programs that would keep the P-Index below a score of 75. Scores over 75 indicate a high potential for P movement from the field. The P-Index score could then be reduced below 75 by applying less litter, adding buffers or applying other management procedures.

Sources of Risk and Transport of Soluble P and Particulate P in Runoff

1. Soil Test P– Soil test P for the index should be determined by analyzing soil samples from the field. Soil samples for P must be done at least every five years for broiler CAFOs. The higher the level of soil test P, the greater the risk score.

2. Organic Fertilizer P– Organic fertilizer P refers to the P added by the application of broiler litter to the field. The method of application also affects the risk of soluble P in surface runoff. Runoff is reduced when application is incorporated into the soil or surface applied at a time of year when the probability of surface runoff is low. Applications that incorporate the litter into the soil substantially reduce the risk factor for soluble P runoff. Most applications of broiler litter, however, are surface applied with no incorporation. Thus, time of year becomes more important. Surface application from May through October (growing season) presents the lowest risk of runoff.

3. Inorganic Fertilizer– The presence of soluble P is greater in commercial fertilizers. The use of these conventional fertilizers increases the risk of soluble P runoff. Applications that incorporate the fertilizer

PUTTING KNOWLEDGE TO WORK

The University of Georgia and Ft. Valley State College, the U.S. Department of Agriculture and counties of the state cooperating.
The Cooperative Extension service officers educational programs, assistance and materials to all people without regard to race, color, national origin, age, sex or disability
An equal opportunity/affirmative action organization committed to a diverse work force..

into the soil substantially reduce the risk factor for soluble P runoff.

4. Curve numbers and Buffers– The P-Index also uses a curve number, or calculation, for fields based on soil type, slope and crop type to estimate the risk of soluble P runoff. In addition, this risk is reduced with the use of a vegetative buffer at the edge of the field. A vegetative buffer is defined as a vegetated area with greater than 80% ground cover, no channelized flow, no P application, and a soil test P of less than 450 lb per acre. In the P-Index, providing a vegetative buffer zone as narrow as 10 feet can significantly reduce the risk of P runoff from a field. A vegetative buffer can be a powerful management tool for reducing the overall P-Index score for a field.

5. Sediment Loss from a Field– Sediment loss from a field (ton/acre) requires computation using a procedure referred to as the Revised Universal Soil Loss Equation (RULSE). Determining this sediment loss factor for a field requires knowledge and training in the use of the RULSE. Your county agent can assist with this aspect of the P-Index.

6. Water Percolation and Depth to Water Table– Water that percolates through the soil can contaminate a shallow ground water or tile water directly connected to surface water. The P-Index estimates the risk of soluble P loss in percolating water by considering the volume of percolating water and the depth of the water table. The P-Index uses a Percolation Index to estimate the risk of leaching from a field. This index uses a curve number associated with the different soil hydrological groups. When the depth of the water table or drainage tiles is less than 0.5 feet (plow layer), it is assumed that all the soluble P in percolating water is transmitted to the water table or tile. However, below 0.5 feet the transmission decreases, reaching a value near zero at 8 feet. Thus, the further the water table from the surface, the less the risk factor. A water table below 8 feet will have no impact on this assessment.

Computation of the P-Index

The P-index for a given field is computed by adding the risks associated with the different pathways of P loss described above. This P-Index has been incorporated into a poultry NMP computer program available through the University of Georgia Cooperative Extension Service. This program has simplified the use of the P-Index so that individuals trained in its use can more easily generate a nutrient management plan that also assesses the risk of P application. Your county extension agent has access to the CNMP Generator software and can assist in the development of poultry NMPs.

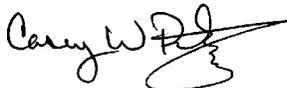
Interpretation of the P-Index

Score of 0--39. Low potential for P movement from field.

Score of 40--74. Medium potential for P movement. Use management practices to keep the score below 75.

Score of 75--99. High potential for movement. Reduce the rate of P application or add buffers. If a P-Index below 75 can not be reached, a plan needs to be developed to achieve a P-Index of less than 75 within 5 years.

Score of 100 or more. Very high potential for P movement. Reduce the rate of application of P or add buffers to achieve a P-Index of less than 100 in the first year. Develop a 5 year plan for reducing the P-Index below 75.



Dr. Casey W. Ritz
Extension Poultry Scientist

Extension County Coordinator/Agent



Dr. Dan L. Cunningham
Extension Poultry Science Coordinator

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

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