



# Northern New York Agricultural Development Program

## FACT SHEET

# 2 in a series on Phosphorus

**Researchers found a steady increase in soil test P levels from 1977-78 to 1995-2001 ...**

**The largest increases occur in the Northern NY region – more than two-fold increase in percentage of samples testing high or very high in P over the past 40 years.**

## Trends In Soil P Status

Principal Investigators: Dr. Quirine Ketterings, Professor of Crop & Soil Science, Cornell University; Jason E. Hahabka, Extension Associate, Cornell University; Professor Emeritus W. Shaw Reid, Cornell University

### Introduction:

#### The Need to Monitor P Levels in Soils

As communities in New York try to balance the needs of local agriculture and environmental quality, phosphorus (P) management has become a hot topic. For a variety of valid reasons, phosphorus in both fertilizer and manure has historically been applied to some farm fields at rates higher of P than will be taken up by crops. Over time, this accumulation of phosphorus in farmland has led to increased soil test P levels.

Runoff from some of these fields may present a higher risk for environmental losses to neighboring water bodies. Increasingly, farmers may need to try to manage their fields to keep phosphorus levels in a target range, high enough to grow healthy crops, but low enough to minimize runoff and leaching losses.

In 2004 Cornell University researchers undertook a study to determine the phosphorus fertility status of New York farmland. The results of that study offer an idea of the current state of soils as well as trends in phosphorus accumulation over time.

### Methods:

#### Soil Samples and Historical Review

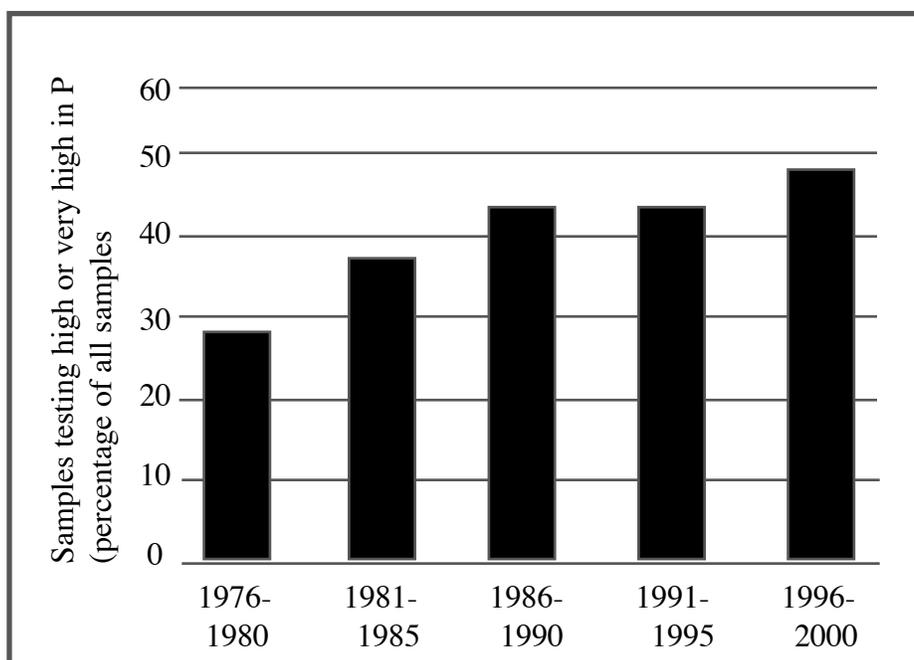
To evaluate the current state of phosphorus fertility in New York, researchers looked at a large pool of laboratory data. The first data set was assembled from nearly 120,000 soil samples collected from commercial farming operations in New York between 1995 and 2001 and submitted to Cornell Nutrient Analysis Lab (CNAL). A second, independent dataset from New York farms was obtained to provide a check and ensure the Cornell data did not contain any bias.

**Given the current soil fertility distribution in the state, fertilizer P use can be limited to small starter or top-dress applications for almost half of the field crop acreage in the state.**

### **Want to know more about phosphorus use?**

The following Northern New York Agricultural Development Program Fact Sheets are available from your local Cornell Cooperative Extension office:

- Why is Phosphorus an Issue for New York State Farms?
- Trends in Soil P Status
- Limiting Phosphorus Use for Corn Growing in NNY Without Sacrificing Yield
- Developing a P Index for NNY Soils
- The Impact of Starter P on Corn Silage
- P Runoff: Rainfall Simulation Experiment Results



**Figure 1. Increase of percentage of soils testing high or very high in P from 1967 to 2000.**

The data was analyzed on a county, regional and statewide basis and then compared with historical New York data published since 1957. From this analysis researchers were able to see how soil test levels have changed over 40 years and what areas of New York have experienced the most significant changes.

### **Results**

When reviewing historical records, researchers found that soil test P distributions (number of samples that are low, medium, high and very high) were very stable from 1957 to 1979. After 1979 though, records show a steady increase in the number of samples testing high or very high, starting from 26% of the samples and climbing to 47% testing high or very high in 1995-2001.

This dramatic increase in soil test P levels was observed across all regions of New York, but the largest changes have occurred in the Northern NY region, where the percentage of samples testing high or very high in P over the past 40 years has more than doubled. Researchers note that some combination of intensification of crop production, dairy farm expansion and consolidation, and high P fertilizer rates could explain the steady increases in soil test P levels.

## Summary

In the past 40 years New York State has seen an increase in the percentage of fields testing high and very high for phosphorus. The current soil fertility distribution in the state is:

- very low or low — 28%
- medium — 25%
- above agronomic optimum — 47%.

Because agronomic response of field crops to additional P is minimal to non-existent at high and very high soil test P levels, fertilizer P use can be limited to small starter or top-dress applications for almost half of the field crop acreage in the state. At the higher soil test P levels, regular applications of manure are expected to meet or exceed crop P requirements in many cases. As soils reach progressively higher P levels, they may require more attentive management to minimize negative environmental impacts.

Please see the Northern New York Agricultural Development Program Fact Sheet #4 in the Phosphorus Series for

### **P Trends Project Sponsors**

This look at historic and current phosphorus levels in soils in New York State was funded by the Northern New York Agricultural Development Program Program and by a 319 non-point source pollution grant from the New York State Department of Agriculture and Markets.

### **Principal Investigators**

Dr. Quirine Ketterings, Assistant Professor, and Jason E. Kahabka, Extension Associate, Nutrient Management Spear Program, Department of Crop and Soil Sciences, Cornell University; and Professor Emeritus W. Shaw Reid, Cornell University.

### **For more information on the P Trends Study,**

contact: your local Cornell Cooperative Extension office, or Dr. Quirine Ketterings, Nutrient Management Spear Program, Cornell University, qmk2@cornell.edu, 607-255-3061, <http://nmsp.css.cornell.edu>.

---

**The Northern New York Agricultural Development Program** selects and prioritizes research the results of which can be practically applied to farms in the six-county region of northern NY: Jefferson, Lewis, St. Lawrence, Franklin, Clinton and Essex Counties.

**To learn more about the Northern New York Agricultural Development Program,** contact Co-Chairs Jon Greenwood, 315-386-3231, or Joe Giroux, 518-563-7523; or R. David Smith, Cornell University, 607-255-7286. ♦

*Trends in Soil P: 3*



Northern New York  
Agricultural Development Program

Northern New York  
Agricultural Development  
Program  
162 Morrison Hall  
Cornell University  
Ithaca, NY 14853  
607-255-7286  
[www.nny.org](http://www.nny.org)