sizing the importance of P placement and variety selection on acid, high-P soils. The Oklahoma and Kansas studies do not suggest that banded P on high P soils is a permanent solution to soil acidity, but do underscore how other cultural conditions affect responses to applied P.

The importance of high soil test P values and annual fertilizer P applications for barley yields were indicated in New York studies. Fertilized barley headed earlier, withstood winter stress better and produced higher yields (**Table 8**). Note that high soil test P levels resulted in higher yields in either of the other P test categories regardless of annual P applications. Highest yields were obtained with the highest annual application rate (80 lb P_2O_5/A) and at the high soil test P level.

Table 8. Annual P fertilization and high P soil tests combine for higher barley yields.

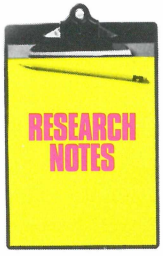
P_2O_5 rate, lb/A	Soil test P level Low	Medium	High
	---------	yields, bu/A	---------
0	7	26	70
20	14	34	89
40	15	40	95
80	21	46	100

New York

Summary

In the final analysis, soil testing is an important best management practice (BMP) to monitor soil fertility levels and to aid in crop recommendations for the future. The probability of a profitable response to P fertilization is much greater on soils that test low in available P compared to soils with high P tests. However, the possibility of a profitable response from additional P applications at high P soil tests is relatively good when other production factors are optimum or when soil, climate and management factors impose stress early in the growing season.

The increasing adoption of conservation tillage practices, accompanied by lower soil temperatures at planting, higher soil moisture content, increased possibilities of soil compaction, and accumulations of soil acidity near the surface, emphasize the need for the use of starter fertilizers containing P to enhance early seedling growth and reduce seedling stress. There is an increased need for soil test P calibration research with new tillage practices and higher yield potentials to be sure that this nutrient is not a limiting factor for yields, profits, and environmental protection through input efficiency. ■



Alabama

Calcination Effect on the Agronomic Effectiveness of Apatitic North Carolina Phosphate Rock

A GREENHOUSE study investigated the effect of calcination . . . to increase the total phosphorus (P) content of apatitic phosphate rock (PR) . . . on the solubility and agronomic effectiveness of apatitic North Carolina PR.

A silt loam soil with a pH of 4.8 was used, with four rates of P being applied. Corn was the test crop and was grown for four weeks for each of two crops.

Results showed that the degree of carbonate substitution for phosphate in the apatite was decreased after calcination, along with citrate soluble P. Both dry matter (DM) yield and P uptake were reduced. Across the range of P rates in the two crops, DM yield reduction averaged 77 percent, compared to uncalcined PR.

Researchers concluded that apatitic PR used for direct application should not be calcined, even though the process increases total P content of the mineral. ■

Source: S. H. Chien and L. L. Hammond. 1991. Soil Sci. Soc. Am. J. 55:1758-1760.