

North Carolina

Phosphorus Reserves High in Coastal Plain Tobacco Soils

By M. Ray Tucker

Available phosphorus (P) in North Carolina Coastal Plain tobacco soils has increased to high levels from continued application of high P fertilizer grades. The fertilizer industry can provide tobacco grades lower in P content and these should be used by growers when soil tests reflect high P availability.

NORTH CAROLINA is the leading state in production of flue-cured tobacco. Demand for tobacco increased dramatically following the Civil War and has grown to the extent that it is now the leading cash crop in the state. North Carolina currently produces around 265,000 acres of flue-cured tobacco, grossing more than \$1 billion annually. Gross income ranges from \$3,000 to \$4,000/A, depending on yields and current market value.

Building Soil P

Recognizing the high market value of tobacco and relatively low fertilizer input costs, growers have traditionally applied high rates of P, above actual crop requirements, as insurance for high yields. In many cases P has been applied when current soil tests indicated none was needed.

Tradition has also played a major role in buildup of soil test P because growers have continued to use grades of P fertilizers such as 3-9-9, 4-8-12, and 6-12-18 even though lower P tobacco grades are available. Plant food utilization data show flue-cured tobacco yielding 3,000 lb/A removes only 25 lb of P_2O_5 . The long-term application of P in excess of crop removal has resulted in significant buildup of P reserves in most tobacco soils.

Soil test summary data from 1988-1992 for the 10 leading Coastal Plain tobacco counties representing about 50 percent of the total flue-cured acreage show the current level of P in tobacco soils (**Figure 1**).

Changes

Starting several years ago, extensive educational efforts were undertaken by the North Carolina Department of Agriculture (NCDA) and North Carolina State University (NCSU) agricultural advisors. Through these efforts, progress has been made in shifting away from the tobacco fertilizer grades high in P (**Table 1**). This educational effort has been enhanced through the cooperation of the fertilizer industry in making tobacco grades such as 6-6-18 and 8-0-24 available for growers. Since 1979, the rate of P applied for tobacco has declined 56 percent (**Table 2**).

Table 1. Changes in P-containing fertilizer grades from leading North Carolina Coastal Plain tobacco counties.

Year	3-9-9	4-18-12	6-12-18	6-6-18
	----- P_2O_5 , million lb -----			
1979	13.53	3.85	5.31	0.37
1980	10.61	3.29	5.14	1.07
1981	8.99	2.27	3.20	1.78
1982	8.33	1.83	1.96	2.23
1983	6.37	1.52	1.17	2.82
1984	6.87	1.41	0.93	3.34
1985	4.41	1.01	0.57	3.31
1986	2.93	0.53	0.26	3.24
1987	3.21	0.53	0.23	3.24
1988	3.53	0.35	0.22	4.23
1989	3.35	0.38	0.17	4.29
1990	3.15	0.52	0.32	5.24
1991	2.61	0.35	0.20	4.52
% Change	-81	-91	-96	+1,122

Data compiled from NCDA Fertilizer Tonnage Reports.

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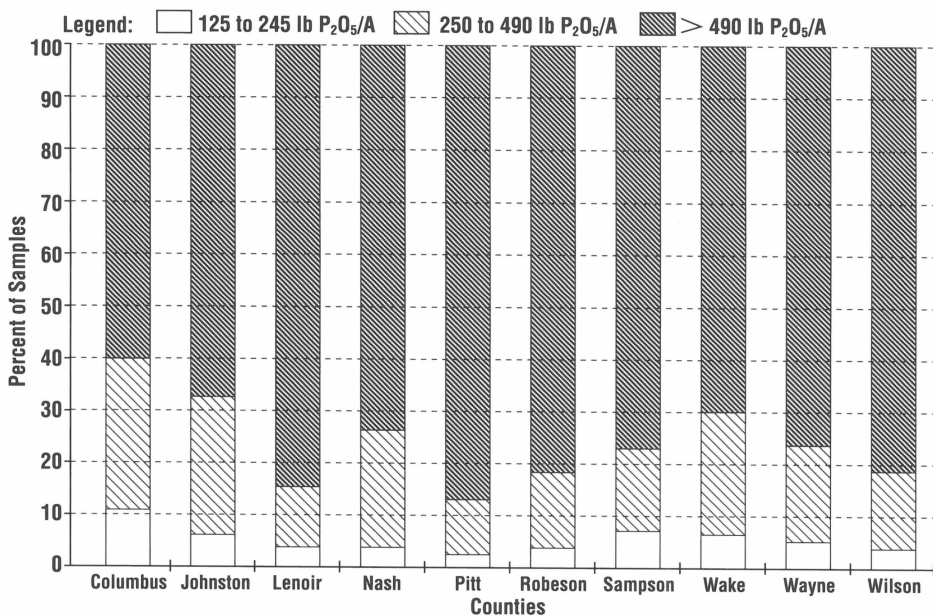


Figure 1. Soil test P summary from leading Coastal Plain tobacco counties in North Carolina. Data from NCDA Agronomic Division's annual soil test summaries.

The data in **Figure 1**, plus extensive research and on-farm tests, indicate that further P reductions could be made without any impact upon tobacco yield or qual-

ity. It is an appropriate time for everyone associated with tobacco production to encourage accurate fertilizer applications that follow soil test recommendations. It is a pro-active approach to environmental concerns and the most profitable one for the grower.

Table 2. Reduction in phosphorus application on North Carolina flue-cured tobacco.

Year	P ₂ O ₅ , Million lb	P ₂ O ₅ , lb/A
1979	24.44	185
1980	22.27	147
1981	19.91	132
1982	15.75	123
1983	12.40	119
1984	13.60	129
1985	10.23	102
1986	7.64	90
1987	7.85	86
1988	8.34	84
1989	8.19	77
1990	9.22	82

Data compiled from NCDA Fertilizer Tonnage Reports; NCDA Agricultural Statistics, Raleigh, NC.

Summary

Soil test summary data show Coastal Plain tobacco soils with high P reserves. These reserves are being addressed by the fertilizer industry with fertilizer grades such as 6-6-18 or 8-0-24. A continued effort should be made to promote such fertilizer grades for tobacco grown on soils with high P reserves. Fertilizer dealers or agricultural advisors can recommend the appropriate fertilization program for meeting nutrient needs beyond P. ■