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J. L. Sims  
*University of Kentucky*

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Department of Agronomy

# Soil Science News & Views



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## EFFICIENT USE OF FERTILIZER ON TOBACCO

J. L. Sims

Recent increases in fertilizer prices and other production costs have stimulated interest in ways to increase the efficiency of fertilizer use while maintaining or increasing yields and quality of tobacco. Growers currently spend about \$250 per acre for fertilizer. Although this represents only 15 to 20 percent of the total cash costs per acre, it is one category of cash expenses that can be decreased.

Soil Test - In their attempt to lower fertilizer costs, many producers have become interested in applying only those nutrients needed for each year's crop. An analysis of a representative soil sample taken from each tobacco field each year is the best way to determine how much fertilizer to apply. Recent summaries of soil samples for tobacco fields which were tested at the University of Kentucky's Soil Testing Laboratory suggest that large amounts of fertilizer are not always needed for good production. These summaries showed that of the samples submitted, about two-thirds of the fields would need no added phosphate, one-third needed no potassium, but about 50 to 60 percent would require lime. Although it isn't efficient to apply more fertilizer than needed, growers should remain aware that tobacco is a high value crop, grows during a relatively short time period, and should be fertilized for maximum yield. That is why University of Kentucky recommendations call for P and K applications at higher soil test levels for tobacco than for most other crops.

Band Fertilizer - Past research has shown that only one-half (phosphorus) to three fourths (potassium and nitrogen) as much fertilizer is required to produce maximum crop yields when the fertilizer is properly banded as when it is broadcast. In addition to the potential for cost savings, recent research at the University of Kentucky has suggested that several advantages accrue from banding including less manganese toxicity, improved early growth, fewer days to maturity, and increased cured leaf yields (Table 1). They occur primarily because the fertilizers are placed in the middles between rows allowing plants to become established after transplanting before roots reach the more acid, fertilized soil zone. High rates of commercial fertilizers commonly broadcast on tobacco fields increase the salt concentration of the soil solution and decrease soil pH by 0.5 to 1.0 pH unit. Such changes may damage plant roots, cause nutrient toxicities and/or deficiencies, and adversely affect plant growth and yield. Keeping most of the fertilizer out of the transplant rooting zone for a short time by banding appears to alleviate many of these problems.

The best system for banding fertilizers to tobacco has not been determined. Research suggests that the bulk of the N and K should be banded 10 to 12 inches to the side of the

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row in either one or two bands, and at depths of 4 to 5 inches. All of the fertilizer should either be banded within 10 days after transplanting in one application or in two applications, half within 10 days and the remainder at 4 weeks after transplanting. Good results have also been obtained by broadcasting one-third of the fertilizer before transplanting and banding two-thirds 1 to 4 weeks after transplanting. The latter system may be particularly important on low fertility soils where nutrients are needed to maintain vigorous growth until plant roots reach the fertilizer band.

Other Practices - If growers broadcast all fertilizers, applying them as near to transplanting (10 days to 2 weeks before) as possible will significantly lessen the chances for losses of nitrogen since rainfall amounts generally are greater than evapotranspiration during April and May in Kentucky and the potential to leach N is great.

Molybdenum is essential for the process of nitrate reduction in plants that leads to the formation of protein and growth. It increases the efficiency of nitrogen use in plants. Application of molybdenum in the transplant water has increased cured leaf yields of tobacco on soils testing less than pH 6.4.

Table 1. Effect of broadcast and band applied fertilizer on burley tobacco.

Characteristics	LOCATION			
	Frankfort		Lexington	
	Broadcast	Band *	Broadcast	Band #
Plant Manganese 45 days, ppm	153	114	365	195
Dry wt., 45 days grams/plant	50	62	29	35
Days to flower	---	---	71	69
Cured Leaf Yield, lbs/acre	2802	2963	3005	3274
Value, \$/Acre	---	---	4297	4682

\* Band was made 12 inches from the row, 4 to 5 inches deep, and 5 days after transplanting.