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EFFECT OF NITROGEN FERTILIZATION ON YIELD OF BURLEY TOBACCO

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Relatively large amounts of nitrogen from fertilizers and manures commonly are used in burley tobacco production. Growers are currently estimated to apply between 150 and 400 pounds of actual N per acre. Fertilization of burley with nitrogen significantly affects the physical and chemical characteristics of cured leaf and produces changes in yield and value. On most soils, leaf yields usually are increased by applications of N fertilizer, but the amount of yield increase per unit of applied fertilizer N varies widely between soils. High rates of N applied pre-plant or at planting often retard early plant growth, delay maturity, and lower cured leaf quality, which may reduce average value of cured leaf. The purpose of this investigation was to study the influence of rate of fertilizer N on yield and value of burley tobacco in order that N fertilizer recommendations may be improved.

A field test was conducted during 1967 at four locations. Each test was conducted on a different soil, and the four soils represented some differences in internal soil drainage characteristics. Locations, soil types, and drainage characteristics are shown in the Table below.

Location	Soil Type	Internal Drainage Characteristics
U. K. South Farm (Fayette Co.)	Maury Silt Loam	Well-drained
U. K. Princeton Substation (Caldwell Co.)	Crider Silt Loam	Well-drained
U. K. Spindletop Farm (Fayette Co.)	Mercer Silt Loam	Moderately well-drained
U. K. Princeton Substation (Caldwell Co.)	Tilsit Silt Loam	Moderately well-drained

The experimental areas had been in mixed-grass or grass-legume sod the previous year. At each site variety Burley 21 was grown and seven nitrogen fertilizer levels (0, 40, 80, 160, 240, 320, and 400 lbs N/acre) were tested. Phosphorus and potassium fertilizer was applied uniformly and in sufficient amounts to all plots. All fertilizer was broadcast on the soil surface and disked into the soil after the area previously had been plowed and disked. The fertilizer was applied about one to two weeks before setting transplants. Conventional cultural practices were carried out at all locations.

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Results

Data for yields of cured leaf are shown in the accompanying figure. The upper curve was drawn through points representing the averages for the Maury, Crider, and Mercer soils; the lower curve represents values for the Tilsit soil only. Yields of cured leaf at all sites were increased by applying N. However, the effect of fertilization was not the same for all soils. Greater amounts of N were required to produce maximum yields on moderately well-drained than on well-drained soils. For the well-drained Maury and Crider soils, yields increased rapidly up to the 160-pound and 240-pound N rates, with small (but statistically non-significant) increases occurring at the higher N rates for Maury soil. In contrast, 240 to 320 lb N/acre were required on the Mercer and Tilsit soils before yield response to N began to lessen.

Value of leaf per 100 pounds was only slightly affected by N fertilization on any soil during this year. Consequently, average value per acre followed leaf yields closely.

These data are results for one year only but appear to be representative of leaf data averaged over years. Although rainfall was above normal for the month of May, rainfall distribution over the growing season was excellent at all locations. Current Agronomy Department recommendations of 200 to 250 lb N/acre on well-drained soils with good grass sods the previous year, and 250 to 300 lb N/acre on soils where amounts of soil N or efficiency of fertilizer use is low, seem justified. Growers using moderately well-drained soil should give consideration to side-dressing part of the N fertilizer at 30 to 40 days after transplanting, to increase the efficiency of N.