

# Look closely at nitrogen use

*How good are university recommendations?*

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**N**itrogen is the most expensive of the fertilizer nutrients added to tobacco. It is also the most difficult to manage, because:

- Nitrogen can be lost from the root zone by leaching or denitrification in wet years.
- There is no generally accepted soil test to indicate when the soil is deficient.
- Adding excessive amounts of N can reduce quality, cause curing problems and lead to undesirable leaf chemical properties.

Extension services in most of the leading burley-producing states recommend N rates of 150 to 200 pounds per acre for burley tobacco. Kentucky recommends 150 to 275 pounds per acre, depending on soil type and crop rotation, but in most cases, 200 to 225 pounds per acre is recommended. Generally farmers in the past have considered these rates to be too low and have applied considerably more nitrogen to their crops.

But recent increases in fertilizer costs and decreases in tobacco prices have caused farmers to look more closely at nitrogen fertilization. In addition, concern in the industry about the tobacco-specific nitrosamine content of a leaf has focused attention on high N rates. TSNA's are carcinogens that occur in a cured tobacco leaf. Reducing the TSNA content is a major goal of the industry.

Higher TSNA content has sometimes been associated with high levels of nitrogen in the leaf, and this has caused industry concern about high rates of nitrogen fertilizer used by some farmers. Some in the industry question university recommended rates as well, thinking they might be too high.

## N RATES COMPARED

For these reasons, university researchers in Tennessee, Virginia and Kentucky conducted a series of nitrogen fertilization experiments of burley starting in 2004. These experiments have looked at nine combinations of preplant and sidedressed nitrogen, with total N ranging from 80 to 340 pounds per acre.

The rates consisted of either 80, 160 or 240 pounds per



**This research plot of burley in Kentucky received 200 pounds of total nitrogen.**

acre of broadcast preplant, followed by either zero, 50 or 100 pounds sidedressed at three weeks after planting. Researchers have looked at yield, grade and TSNA content of cured leaf resulting from these rates.

The experiments were conducted at two experiment stations (Greenville, Tenn., and Glade Spring, Va.) in 2004 and at four stations (the original two plus Springfield, Tenn., and Lexington, Ky.) in 2005 and 2006.

Results are available for 2004 and 2005, and the yields from these two years, averaged across all six experiments, are given in Table 1.

The first thing to notice is the relatively small response to N overall. The difference in yield between the lowest rate of N (80 pounds preplant with zero pounds sidedress) and the highest rate (240 pounds preplant with 100 pounds sidedress) was only a little more than 200 pounds across all six experiments.

Looking at each individual test, the largest difference observed was about 400 pounds of leaf, and the smallest was less than 100. The small response to N may partly have been due to the fact that all six experiments were in good rotations — five cases following two years of sod, and the other experiment following soybeans.

**TABLE 1**

| Yield of burley tobacco by nitrogen rate                                |                                 |       |       |
|---|---------------------------------|-------|-------|
| Average of six experiments in Tennessee, Virginia and Kentucky, 2004-05 |                                 |       |       |
| Sidedress nitrogen (lbs. N/acre)  | Preplant nitrogen (lbs. N/acre) |       |       |
|   | 80                              | 160   | 240   |
|   | Yield (lbs./acre)               |       |       |
| 0   | 2,435                           | 2,504 | 2,707 |
| 50  | 2,552                           | 2,642 | 2,689 |
| 100   | 2,622                           | 2,632 | 2,665 |

## MAXIMUM YIELDS

Looking at yield by N rate, yields were lowest at 80 and 160 pounds per acre of N without sidedressing, followed by 80 pounds per acre plus 50 pounds N sidedressed. At all rates higher than these, yields were about the same.

The lowest N rate that gave near maximum yields was 80 pounds preplant

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