

Influence of Topping and Harvest Management on the Evaluation of Data
From Burley Tobacco Variety Trials

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Introduction

Tobacco producers are always interested in new tobacco varieties, and are continually searching for the "best" variety. Producers receive information about varieties from a number of sources including; research and extension publications, county extension agents, neighbors, farm supply workers, and seed producers. To help producers evaluate varieties, county agents in cooperation with tobacco specialists conduct many burley tobacco variety trials at the county level.

All varieties in a test plot are typically topped and subsequently harvested at the same time, despite wide differences in maturity dates. This is generally done to simplify experimental procedures. The recommended time of topping for most burley tobacco varieties is when 10 -25 % of the plants have at least one open flower. The earliest varieties, in a trial, may reach 100% bloom before the later varieties have begun blooming. This means that early varieties are topped beyond the optimum stage while later ones have not yet reached the optimum stage. In either case, a reduction in yield and quality could result for varieties not topped at the optimum stage of flowering.

Methods

Variety trials were conducted in 1994 and 1995 at the University of Kentucky's Woodford County Farm to investigate the potential effects of the time of topping and harvest on varieties with different maturity.

In 1994, 15 varieties were transplanted on June 6. The varieties were split into two groups based on maturity. Four varieties, NCBH-129, R 610, KY 14, and N126 were placed into both groups since they are generally considered to be of medium maturity. Varieties in the early maturing group were topped on August 15 (69 days after transplanting) and harvested September 6 (91 days). Varieties in the late group were topped August 22 (76 days) and harvested September 22 (105 days).

In 1995, 14 varieties were transplanted on June 7, and all were managed in two groups as both early and late maturing. The early group was topped August 10 (65 days) and harvested September 4 (90 days). The late group was topped August 18 (73

days) and harvested on September 5 (91 days). The late group was harvested early because dry weather had stopped growth and was causing leaf deterioration.

After harvest, tagged sticks were hung in a common location in a conventional barn for curing. The tobacco was stripped into three farm grades based on stalk position. Federal Tobacco Graders assigned grades to each stalk position. These grades were converted to a numerical grade index (Bowman et al. 1989). In theory, the higher the grade index the higher the quality. The grade index concept assumes that B1F, B1FR, C1F and B1R are the highest quality tobacco. This assumption of quality may not be valid under the current demand situation.

Results and Discussion

In 1994, the late topped varieties tended to have higher cured leaf yield, but a lower grade index than the early topped group (Table 1). This difference in yield was most likely due to the fact that the late managed group had 29 days between topping and harvest while the early group had only 22 days. The extra week allowed the late managed varieties to achieve greater leaf growth, while the somewhat premature harvest of the early varieties did not allow them to reach full yield potential. However, later topping and harvest may have resulted in slightly greater leaf damage and thus, a lower grade index. Leaf from the lower stalk position of the late managed group was graded as flyings (X group) while the lower stalk tobacco from the early managed group was graded as cutters (C group). The late managed crop was cured under drier conditions, and had more green and mixed colors than the early managed crop.

For the four varieties managed as both early and late maturing, there was little change in their yield rank relative to each other, as a result of management. These four varieties are all similar in maturity and thus reacted similarly when managed alike.

In 1995, the tendency was for lower yields following late topping and harvesting (Table 2). This resulted primarily from dry conditions and premature harvest of the late managed crop (only 18 days after topping) that did not allow for further growth. The late management did result in a slightly higher grade index than early management. This was the result of a greater degree of damage on the early topped crop due to the dry weather. The early topped tobacco had more “firing-up” than the later topped tobacco.

More important than the absolute yields, however, is how the varieties were affected by management relative to each other. In this case, there was a wide range of maturity dates. Late maturing varieties like KY 907, and TN 86 ranked in the bottom third when topped early, but were the two highest yielding varieties when topped later,

even though yields were hurt by a premature harvest (Table 3). Early maturing varieties like KY 14 x L8, R 610, and C 402 moved down in yield ranking with later topping. Some varieties, like NCBH 129, did not follow this pattern. Although NCBH 129 is considered to be relatively early maturing, its ranking increased with later topping. It has been previously observed that this variety will suffer yield loss if topped too soon. Some varieties like Ky 14, KY 8959, C 403, and NC 3 were relatively unchanged in ranking as a result of management. This suggests that these varieties are perhaps more flexible than some others.

This study has demonstrated that topping and harvest management affected variety performance in different and sometimes unpredictable ways. All of this should be kept in mind when evaluating data from local variety trials, where all varieties have been managed in the same way. Recognize that the lack of optimal management for some varieties may reduce their performance relative to other varieties in the test. Realize also, that differential response to management can be used to advantage when scheduling work operations during busy times. This is one reason why it is recommended that producers use the "stick row" test to evaluate new varieties on their own farms.

Local variety trials are just one of many sources of information about new varieties. Producers should always consider the need for disease resistance, the management characteristics, and the agronomic performance when selecting a variety. When a producer grows several different varieties, each should be managed according to its special needs, and capabilities.

Literature Cited

Bowman D. T., R. D. Miller, A. G. Tart, C. M. Sasscer Jr, and R. C. Rufty. 1989. A grade index for burley tobacco. *Tobacco Science*. 33:p.18-19.

Table 1. Influence of topping and harvest management on the yield and grade index of burley tobacco grown in 1994.

| Variety | Early Top and Harvest | | Late Top and Harvest | |
|------------|-----------------------|-------------|----------------------|-------------|
| | Yield lbs./A | Grade Index | Yield lbs./A | Grade Index |
| KY 14 X L8 | 3229 | 83 | | |
| C 501 | 2816 | 84 | | |
| R 611 | 3129 | 84 | | |

| | | | | |
|---------------------|-------|-----|-------|-----|
| NCBH 129 | 3126 | 80 | 3532 | 84 |
| R 610 | 3011 | 83 | 3453 | 85 |
| KY14 | 3238 | 79 | 3512 | 77 |
| N 126 | 3155 | 80 | 3454 | 78 |
| C 403 | | | 3606 | 73 |
| NC 2 | | | 3319 | 78 |
| KY 14 X BU 64 | | | 3157 | 79 |
| TN 90 | | | 3320 | 74 |
| KY 907 | | | 3581 | 68 |
| TN 86 | | | 3596 | 79 |
| KY 8959 | | | 3730 | 76 |
| N 88 | | | 3103 | 79 |
| LSD _{0.05} | 283 | 8 | 283 | 8 |
| Mean | 3101* | 82* | 3447* | 77* |

* Management Effect Means: LSD _{0.05} Yield = 95; Grade Index = 3

Table 2. Influence of topping and harvest timing on cured leaf yield and grade index of some burley tobacco varieties grown in 1995.

| Variety | Early Top and Harvest | | Late Top and Harvest | |
|---------------------|-----------------------|-------------|----------------------|-------------|
| | Yield lbs./A | Grade Index | Yield lbs/A | Grade Index |
| KY 14 X L8 | 2613 | 66 | 2354 | 70 |
| C 501 | 2595 | 68 | 2375 | 71 |
| NCBH 129 | 2574 | 69 | 2497 | 71 |
| C 402 | 2809 | 70 | 2362 | 73 |
| R 610 | 2830 | 68 | 2428 | 72 |
| KY 14 | 2788 | 66 | 2663 | 59 |
| C 403 | 2786 | 60 | 2589 | 64 |
| NC 2 | 2524 | 68 | 2495 | 72 |
| KY 14 X BU 64 | 2622 | 65 | 2327 | 66 |
| TN 90 | 2646 | 67 | 2411 | 70 |
| KY 907 | 2588 | 55 | 2827 | 61 |
| NC 3 | 2741 | 70 | 2552 | 75 |
| TN 86 | 2602 | 62 | 2780 | 69 |
| KY 8959 | 2744 | 60 | 2614 | 67 |
| LSD _{0.05} | 224 | 8 | 224 | 8 |
| Mean | 2676* | 65* | 2519* | 68* |

* Management Effect Means: LSD _{0.05} Yield = 60; Grade Index = 2

Table 3. Relative yield ranking of burley tobacco varieties as influenced by topping and harvest management in 1995.

| Early Topping and Harvest | Late Topping and Harvest |
|---------------------------|--------------------------|
| R 610 | KY 907 |
| C 402 | TN 86 |
| KY 14 | KY 14 |
| C 403 | KY 8959 |
| KY 8959 | C 403 |
| NC 3 | NC 3 |
| TN90 | NCBH 129 |
| KY 14 x BU 64 | NC 2 |
| KY 14 x L8 | R 610 |
| TN 86 | TN 90 |
| C 501 | C 501 |
| KY 907 | C 402 |
| NCBH 129 | KY 14 x L8 |
| NC 2 | KY 14 x BU 64 |