best burley
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Editor's Column

A TIME TO TOP, A TIME TO CUT

By Don Fowlkes, BSC

The timing of topping and harvesting is very important to the yield and quality of your burley tobacco. Topping later than the optimum time will sacrifice yield, could make sucker control more challenging, and perhaps could lower the chances of producing red leaf. Most modern late-maturing burley varieties should be topped as soon as a desired leaf number is reached or no later than when about one-third to one-half of the plants reach the button to elongated button stage of flower development. This is before pink blooms open.

Reducing the rate of MH for sucker control can be important in managing for low MH residues. Some growers believe this helps upper stalk leaf color as well. Be sure you know which formulation of MH you are using. Some formulations are more concentrated than others and require less product to get the desired rate.

See the article by Andy Bailey on topping and sucker control.

The interval between topping and harvest is a big factor in yield. See the article on that as well.

Be sure to inspect the barns you will use this year well before the time to hang tobacco in them. Then you will still have some time to do that and time to make repairs or improvements as needed. Barn safety is not talked about a lot but is very important. Nobody wants accidents, but they can and do happen. Make barn inspections a check box on your to do list.

Summer is here. Who knows what weather patterns the next few months will bring. Whatever the weather, apply all the management tools and resources at your disposal to produce a crop which will be valued in the marketplace. This includes managing the curing environment – a critical factor in cured leaf quality. See the information on that in this newsletter. For those of you who grow dark tobacco, check out Bill Mak's article too.

We thank you for your efforts and your business. Call on your Extension agent whenever needed, and contact us whenever you have questions or want to talk tobacco.

PLAN FOR EFFECTIVE SUCKER CONTROL IN 2017

Andy Bailey, Tobacco Extension Specialist, Univ. of KY / Univ. of TN

Timely topping and effective sucker control practices are critical to maintaining good yield and quality for burley tobacco. Early removal of the flower bud diverts the plant's energy away from seed production and towards leaf production. Hormonal changes also occur in the plant at topping that increase root growth and lead to desirable physical and chemical properties as the plant matures. With current tobacco crops being larger, with staggered transplanting dates and different varieties of varying maturities being used to extend the harvest window, it's easy not to think much about topping and sucker control until it is time to start topping.

Ideal topping time for most burley tobacco varieties is when 10 to 25 percent of the plants in the field have at least one open flower. Late maturing varieties like KT 206, KT 209, HB3307, and HB4488 may respond better to bud topping prior to 10 percent bloom, and extremely late varieties like KT 210 and NC 7 will require bud topping prior to 10 percent bloom in order to maintain plants at a manageable height at harvest. Topped burley plants should have 22 to 24 usable leaves left on the plant (not including small bottom leaves that will most likely be lost prior to housing). This optimum number of leaves gives the plant potential to develop four distinct grades, including a true tip (T) grade. All burley varieties can produce several more leaves than this, but extra leaves beyond 24 does not necessarily mean extra yield. Root development dictates how many leaves can be supported by the plant, and often topping to more than 24 leaves only results in smaller leaves, as well as increased stripping labor, and increased risk of houseburn and sweat in older barns.

As soon as the terminal bud is removed at topping, the plant immediately puts energy into production of suckers at leaf axils. Many of the benefits of topping at the appropriate bloom stage and leaf number are lost if suckers are not controlled. Poor sucker control can result in yield reductions of 30 to 40 percent, not to mention the hand labor required to make the plant harvestable. Some varieties, such as the early maturing KY 14xL8 and KT 212, are known to have more rapid and vigorous sucker growth that may require early topping and more aggressive sucker control strategies.

Currently, effective sucker control programs for burley tobacco are centered around an application of maleic hydrazide (MH). MH is still the only true systemic sucker control chemical available and is the most effective chemical we have for sucker control. MH allows for economical sucker control through simple broadcast spray application. Although there have been lots of university research trials conducted to develop sucker control programs that do not include MH, the vast majority of these trials have shown that even the best MH-free programs do not provide sucker control than is equivalent to programs that include MH. Applications of contact fatty alcohols and local systemics like butralin or flumetralin in combination with MH are usually the most effective sucker control programs, particularly in uneven crops. Our standard recommendation is to apply 1.5 gallons of a regular concentrate MH product or 1 gallon of a high concentrate MH product per acre, tank-mixed with 0.5 gallons of butralin or a flumetralin product at topping. Although contact fatty alcohols are often overlooked by burley growers, these products can be valuable components of burley sucker control programs, particularly in uneven crops where some plants are too small to receive an MH application. The value of contact fatty alcohols in an uneven crop is that they can be sprayed over all plants and burn suckers on contact while not affecting the usable leaves

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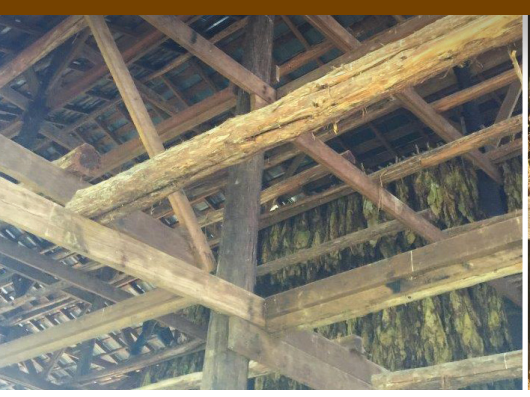
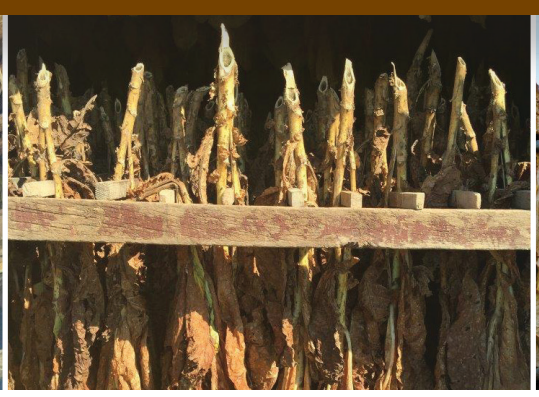
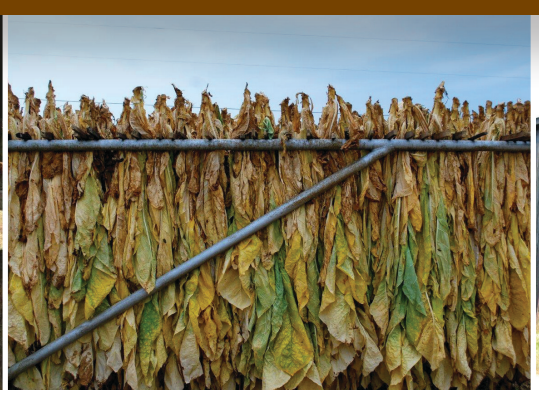
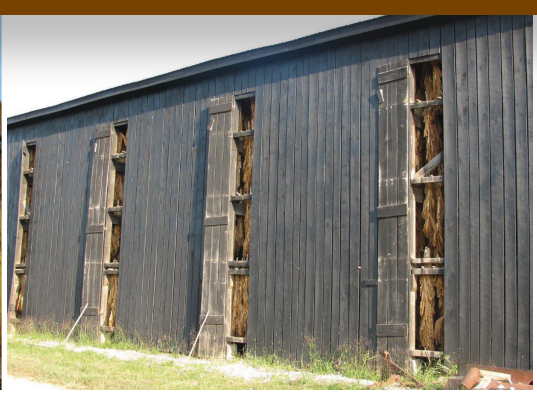





CUTTING AND HANGING CONSIDERATIONS

By Don Fowlkes, BSC

Harvesting

Worker Training
Make sure your harvesting and housing workers receive training (from you or someone working for you) on safety, GTS (Green Tobacco Sickness) prevention/treatment, and heat stroke prevention/treatment. This training need not be formal or lengthy -- just a conversation and providing information in brochures or posters. Keep records to document this training.

Topping to Harvest Interval
Studies have shown that early harvesting – before the crop has reached optimum maturity – results in reduced yield potential except in cases of extremely high disease pressure.

Every crop is unique and must be evaluated on its own merits for readiness for harvest. However, burley tobacco typically increases in yield as the topping-to-harvest interval increases over a reasonable time frame, such as from 3 weeks to 4 weeks to 5 weeks, depending somewhat on weather conditions and variety. This trend of increased yields has been documented even when lower leaf loss is occurring from drought or disease.

In recent years, the availability of labor seems to dictate when the crop is cut. Timing here is critical. You don't want to cut too early or too late. Fortunately, the crop usually has some leeway for a week or two. So, work with your crew or crew leader to manage the harvesting date in accordance with the topping-to-harvest interval you want.

Field Wilting
The availability of labor can also determine the length of time that stuck-out tobacco stays in the field before pick up for housing. This, too, poses concerns. Just as you don't want to pick up before any sunburn is gone, you don't want the tobacco to stay stuck-out too long. That increases the risk of rained-on mud, rotting, or excessive drying. All of which reduce quality and/or yield.

Again, make arrangements for your crew to come house your tobacco a specified number of days after harvest. Three days is common and 5 is acceptable (for typical weather conditions). Much after that and the above-mentioned concerns come into play.

Note that scaffold trailers minimize these concerns. They can also be useful at take-down and stripping time.

Housing

Barn Preparation
Be sure to inspect all barns well before housing. Make sure the tier poles/rails are structurally sound and safe. Repair or replace poles as necessary. Clean out the barn and barn floor. This may help with NTRM prevention later.

Make sure the ventilation doors work properly. Consider making ventilation doors for barns which do not have them, especially if the barn is located in a low area that doesn't get much air flow. Also check that the roof doesn't have leaks.

Hanging Density and Cured Leaf Color
Spacing between sticks on the rail/pole is an important management decision. It also is a bit of a gamble since you can't reliably know what the weather is going to be for the duration of the curing season.

A dry curing season warrants hanging the sticks close together to prevent or minimize bright or mottled (K) cured leaf color. A wet curing season warrants spacing wide enough apart to allow sufficient air movement to prevent or minimize houseburn. The traditional balance has been to hang somewhere in the range of 6-10 inches between sticks in conventional barns, according to barn location, expected weather, plant size, water content in the plants, etc.

With today's non-traditional weather patterns and reduced barn availability situation, the 10 inches is considered too wide. Six inches is a reasonable target in many situations, perhaps 8 inches for barns in low areas with limited air movement. In drought conditions, which are not expected to break in the upcoming few weeks, and/or with tobacco going to the barn with low moisture levels, hanging the sticks as close as possible make sense. Growers who did this last year were generally pleased with that decision. Just remember that houseburn conditions can occur, and houseburn reduces yield, quality, and market value. And the weather this fall may be different. The decision about stick spacing is yours and must be made with the best information you have available about weather forecasts and previous experience.

A Balancing Act – Curing for Quality Leaf Color and for Low TSNA Levels
Today's burley market pays a premium for tannish red (FR) to red (R) cured leaf color. The curing environment is the primary factor in producing this kind of burley tobacco. It likewise is a primary factor influencing the levels of TSNAs in burley. Temperature, humidity, and air flow are the critical components of the curing environment. Lowell Bush and Anne Jack at the University of Kentucky have conducted a lot of research on this subject. See the information boxes by Anne Jack on Factors Affecting Curing.

Conventional wisdom says that to get FR-R color, the curing environment should be humid and warm enough to border on houseburn conditions -- almost but not quite full blown houseburn. This perspective recognizes that FR-R color requires ample moisture/humidity and warm temperatures during the initial 3 or 4 weeks of cure. Then off-and-on afterwards so the tobacco comes in and out of order/case.

In recent years, we know that curing conditions which favor houseburn also elevate the risk of increased TSNA levels. Recall that TSNA stands for "tobacco-specific nitrosamines," which are a class of nitrogen-based compounds known to be harmful. TSNA levels in burley tobacco have been significantly reduced in recent years, due in great part to programs like the LC (low converter) seed project plus efforts to avoid over-fertilization with nitrogen and to prevent houseburn curing conditions.

But even with LC seed varieties and proper fertilization, TSNA levels can go up if curing conditions are wet, warm, and humid for extended periods. Managing the in-barn curing environment ventilation and air flow to minimize houseburn conditions is critical during these periods. Under these conditions, the concern switches from desirable red color to undesirable black color.

Is the goal to produce FR-R color in tension with the goal of keeping TSNA levels low? They are only if your barn(s) cannot be adequately ventilated during extended wet, warm, humid weather periods.

Adequate ventilation involves not just the barn access doors, but also one or more dedicated ventilation structures such as ventilation doors/windows, openings along the bottom and/or top sides of the barn, roof vents, ridge vents, sometimes circulation fans, and always the stick spacing. Moving air is better than stagnant air in times of prolonged wet weather.

With these kinds of ventilation capabilities, you can manage for red leaf color and against houseburn/possible high TSNAs. You don't have to be a victim of whatever weather comes along during the curing season. You can't afford to be that kind of victim in today's burley market. We thank you for your efforts to manage the curing environment in your barns or field structures.

DARK TOBACCO REMINDERS

By Bill Maksymowicz, BSC

Regardless of whether you're growing burley, dark-fired or dark air cured tobacco, production problems don't discriminate. Whether it's herbicide failure (or injury,) soil-related issues (low pH, poor planting conditions,) weather or diseases, any number of challenges can affect all types and increase your production costs, lower yield, reduce quality, and result in lower per acre profits.

High yield and quality are the main targets and tobacco chemistry, particularly TSNAs, have become an important quality component in the buyers' assessment of quality. Most of you are aware of the FDA proposing an extremely low allowable level of one specific TSNA —NNN— in manufactured products using dark tobaccos. So what can we do about it to give the manufacturers the basic product they need to meet the new requirements?

There are some basics most of you are already doing from using "LC" varieties to better managing nitrogen fertilization to minimize the risk of high TSNA levels in the cured leaf. Beyond that there are some other practices you should have in your plan. No one practice is a cure-all but taking more care through the harvesting and curing process will improve your chances of producing tobacco with more desirable chemistry.

Sucker Control Suckers, even small ones, on the plant when it's cut and spiked can hold dirt, dust and moisture that can contribute to houseburn. Houseburned or sweated tobacco often means higher TSNA levels. Topping on time makes sucker control easier, cuts down on bacterial hollow stalk problems, and means more pounds of leaf on the stalk.

Cutting and Spiking Try to keep the tobacco as clean as possible when cutting. It's no different than if you rubbed dirt into a cut: the likelihood of an infection increases. In the case of dirty tobacco, the "infection" is the bacteria on the dirt that can cause TSNA levels to increase. It's tempting on later cut tobacco to cut and pile it before spiking to cut down on breakage. Tobacco piled usually will heat and that heating is the result of bacterial activity. I'm getting repetitive but increased bacterial activity often results in increased TSNA levels. If tobacco is spiked and transported on flat bed wagons that tobacco should be housed immediately. Letting it sit on a wagon overnight makes for the same heating and chemistry problems described above.

Housing When hanging tobacco make sure that the stalks are spread evenly across the stick and leave proper and consistent spacing between sticks (see the production guide for recommendations.) If air movement is blocked because stalks or sticks are pressed against each other, odds are you've put at least a pocket of houseburn in motion. When hanging taller tobacco in barns that have a tier spacing shorter than the tobacco make sure that as each lower rail is hung the tobacco is "shingled." The time and effort to ensure good airflow through the barn will pay dividends in both yield and quality.

Firing/Curing Moisture control through the curing process is key to good color and chemistry. Curing is a two stage process: in the first stage the chemical and color changes take place. It's a balancing act. Too much moisture and the tobacco will sweat or rot, too little and the tobacco cures up with high color and/or green streaking. Once the desired color is attained you can move to stage two of curing/drying the tobacco. It's important as you transition from stage one to stage two that you increase heat or air flow so the process isn't interrupted. If the process is interrupted the stems may not completely dry resulting in "fat stems" which have a tendency to hold moisture and can cause chemistry problems during market preparation.

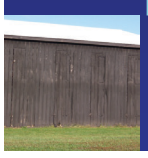
You can't rush a cure. Cooler temperatures will take longer for color to come through, making moisture management more important. With more farmers using dark-fired barns for more than one curing cycle it can be tempting to "push" the color by keeping moisture excessively high during the early stages of curing. More often than not the tobacco may look fine after it's dried but the risk of bad leaf chemistry rises significantly. Try to plan your cutting to allow for a more natural cure.

Taking down/market preparation It's not always possible to wait for tobacco to come into order naturally. So, if using water to soften it, go slowly, be careful, and when tobacco is bulked check it frequently.

The main message is pretty clear: moisture is critical to a good cure but when not managed correctly can cause quality problems that go beyond what the tobacco looks like when it's delivered and the same principles of curing for dark apply to burley as well. The Tobacco Production Guide has more information on helping you get a better cure and Dr. Andy Bailey's (University of Kentucky) web page is a great resource for information and research results that will help you grow the kind of tobacco the industry is wanting https://darktobacco.ca.uky.edu/

Factors Affecting Curing

- Temperature
  - ↑ temperature, ↑ TSNAs (if still humid)
    - Biological & chemical reactions ↑ as temps ↑
- Relative Humidity
  - ↑ humidity, ↑ TSNAs
    - High humidity favorable for bacteria (nitrite)
    - Longer cure, leaf active longer
- Air movement
  - ↑ air movement, ↓ TSNAs
    - Lowers humidity
    - Increases drying rate of leaf



Effect of Curing on Tobacco

- High humidity, high temperature
  - High TSNAs, barn rot
  - Conducive for microbial growth
- Low temperature or low humidity
  - Low TSNAs, green / variegated tobacco
- Optimal for quality tobacco
  - Unacceptable TSNAs if high conversion
  - Usually acceptable TSNAs if low conversion
- Challenge
  - Produce quality tobacco with acceptable TSNAs

Ventilation Study

Well ventilated with fans

Vents closed

Ventilation cont.

- Excessive ventilation → poor quality
- Natural ventilation
  - Manage vents
  - Avoid overpacking
- Barn location, orientation important
  - Hill, exposed
    - Lower TSNAs
  - Hollow, limited air movement, by river
    - Higher TSNAs

By Anne Jack, University of Kentucky

EFFECTIVE SUCKER CONTROL *continued*

on smaller plants. In most cases, an uneven crop won't require more than one contact before all plants are large enough to make the MH application, but contacts can be applied as many times as needed for more uneven crops. Many of our university burley sucker control trials have shown that with later maturing varieties, one contact application made just prior to topping, followed by the standard MH plus butralin or flumetralin application 7 days later often results in yield increases of 60 to 120 lbs/A, compared to just applying MH plus butralin or flumetralin at topping. Delaying the MH application by 7 days allows upper leaves to develop more fully, with little or no impact on MH residues since these later maturing varieties are normally harvested at least a week later than earlier maturing varieties anyway.

An experimental approach to burley sucker control that we are currently researching is the idea of chemically topping the crop with early pre-bud applications of MH with the goal of eliminating the need for manual topping. Although this research is still ongoing, our preliminary results have suggested that an early pre-bud application of the standard MH plus butralin or flumetralin made to a late-maturing variety, when only about 10 percent of the plants in the field are even showing the top of the bud, can result in yields that are equivalent or only slightly less than if manually topped with MH plus butralin or flumetralin applied at topping. This pre-bud application would occur about a week prior to when the plants would normally be manually topped. Although this approach requires an even crop and a later-maturing variety such as NC 7, KT 210, or KT 215, the labor savings from not spending 2 to 4 man-hours per acre in manual topping would more than compensate for any minor yield decreases that may occur with this chemical topping approach. Our results also suggest that MH residues may be reduced with this chemical topping approach since MH is applied about a week earlier than normal. Be aware that, since this research is not yet complete, chemical topping is not yet a standard recommendation. However, a few larger burley growers in Kentucky have tried chemical topping on a small scale last year, and this may be worth a try on a few acres on your farm, particularly if labor becomes tight around topping time.

Remember that with sucker control, as with anything in tobacco production, it is much easier to stay ahead of a problem rather than getting behind and trying to catch up. Start early this year thinking about your topping and sucker control programs for burley tobacco.

Tobacco Tidbits

Prior to the late 1800s, tobacco use in the U.S. consisted primarily of cigars, chewing tobacco, and pipe tobacco. But when James Bonsack of Virginia patented the first modern cigarette-making machine in 1881, the cigarette business grew rapidly. James Duke of North Carolina adopted the use of these machines in 1884 and quickly built a large national market for cigarettes in the U.S.

By 1889, James Duke and Sons had built a tobacco business empire that was the largest cigarette company in the world. This tobacco trust operated primarily under the name American Tobacco Company and grew to monopolize about three-fourths of the world market.

In 1911, the U.S. Supreme Court ruled that the American Tobacco Company was in violation of the Sherman Antitrust Act and ordered its breakup into four separate major companies. The names of these companies were: the American Tobacco Company, Liggett and Myers, R.J. Reynolds, and P. Lorillard.

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