

*Harvesting, Curing
and Preparing*
Dark-fired Tobacco
for Market

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Harvesting, Curing and Preparing Dark-fired Tobacco for Market

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A major problem of dark tobacco production, and probably the most troublesome, is the proper curing of the leaf. The principal difficulties are maintaining the correct temperature and providing suitable relative humidity in the barn.

Experiments have been conducted at the Western Kentucky Substation at Princeton comparing two methods of fire-curing dark tobacco. The "old" or "hard fired" method, using high temperature and low humidity, was compared with the "soft" or "slow" cure method, using low temperature and high humidity. Equal results can be attained with these methods, if care is exercised with each throughout the curing process. However, the soft cure method seems to be the most practicable since it is easier to produce the environment essential in curing and there is less danger of destroying the life and stretch of the finished leaf.

The tobacco leaf may be killed by too low or too high temperature, or by low humidity. Excessive heat, particularly when there is a lack of moisture, permanently sets the colors in the leaf. High temperature may also destroy the natural oils in the leaf, resulting in a loss of its soft, stretchy characteristics. Tobacco that has been subjected to temperatures of 100°, or above, for any extended period of time, seldom shows "life". In the slow curing method, temperatures of 80° to 90° are maintained until the tobacco is cured. At these temperatures, the natural oils are preserved and the tobacco remains soft and stretchy.

BARN STRUCTURES

The location and construction of the dark-fired tobacco barn have a great influence on the proper curing of the tobacco. Barns for air-curing tobacco should be located in a relatively open area for free movement of air, while those for fire-curing should be located in a wooded or sheltered area to prevent extreme fluctuations in temperature and humidity. Tobacco in barns located in low places also tends to come in order sooner, which is desirable in the soft cure method.

In building a new barn, or remodeling an old one, it is important to make it as nearly air tight as possible and to provide a good system of ventilation. Side ventilators are not needed and should be avoided. A tight barn holds heat and moisture when desired and is constructed with foundation and ridge ventilators so that moisture can escape through air circulation when necessary. In a barn so constructed, the

proper temperature and moisture conditions within the barn can more nearly be produced and maintained. For detailed barn plans for fire-cured tobacco, write the Department of Agricultural Engineering, University of Kentucky.

Most fire-cured tobacco barns that are not properly constructed can be improved at a relatively low cost. Usually all that is needed is to strip the cracks and remodel the ventilators. The inlet ventilating doors at the base of the barn walls on each side should run full length of the barn. For barns 24 feet wide or less, the width of the effective ventilating opening should be 10 inches. For barns over 24 feet wide, this opening should be 12 inches. The doors on the bottom ventilators for fire-curing are placed so as to direct the air above the fires, when open. In a properly constructed barn this is the only provision made for air to enter the barn.

Ridge ventilators may not be needed on barns with shingle roofs as the openings in the roof may permit sufficient circulation of air when proper bottom ventilators are installed. However, tight roof barns, particularly those with sheet metal roofs, need a ridge or top ventilator.

TOPPING AND SUCKERING

Dark tobacco should be topped as soon as the flower bud appears, leaving 12 to 16 leaves, depending on lateness in the season, land capability based on past performance, the analysis and quantity of fertilizer used, spacing of the plants, and soil moisture. To get a good "fill" on the leaves, keep the suckers closely pulled and never allow them to become large. Hand suckering is the best method of sucker control in the production of high quality tobacco. Close suckering, although time consuming, tends to improve quality and is desirable in dark tobacco. This will usually require completely suckering the crop three or four times. Because of the labor required in suckering dark tobacco, some growers have resorted to use of oils or chemicals to retard sucker growth. Sufficient experimental data using sucker inhibitors have not been obtained to recommend their use.

HARVESTING AND HOUSING

Tobacco should not be cut until ripe. Ripe tobacco cures much more easily and usually with a better color. Dark tobacco is ready for harvest when the leaves begin to lose their intense green color and small yellow areas begin to appear. At this stage, the leaves have a slight yellowish cast, and crack readily when doubled between the fingers. When ripe, the leaves are brittle and break or bruise easily. Extreme care should be taken to reduce loss due to leaf breakage and to puncturing the leaf on stubble during harvesting.

Dark tobacco may be harvested either by splitting or spearing.

However, splitting the stalk increases the rate of moisture loss and promotes rapid curing. In splitting or in spearing, place 5 or 6 plants on a stick.

Well wilted tobacco is easier to handle and cure. Many problems in the soft cure method can be avoided if the tobacco is well wilted before housing. Scaffolding dark tobacco to wilt is a very desirable practice. In this way, wilting may take place in a few hours if the weather is warm and dry, but may take overnight under less favorable conditions. Leave the tobacco on the scaffold until it wilts well, but in no case longer than four days. The advantage of scaffolding is that it allows the tobacco to wilt without danger of serious injury from sunburn, whereas tobacco on a standing stick, or split and turned upside down, often sunburns before wilting. It is a good practice to cover the sides of the scaffolded tobacco with old canvas or burlap bags to prevent sunburn on the lugs. In case of rain serious damage is less likely to occur with scaffolded tobacco. A good practice is to cut and scaffold one day and house the second morning if the tobacco is properly wilted.

After the tobacco has properly wilted and housing has begun, fill the barn as quickly as possible. This practice tends to promote uniformity in curing. For curing in August and September, place the sticks 12 to 14 inches apart on the tiers. In housing tobacco in late September it is advisable to place the sticks from 8 to 10 inches apart on the tiers. *The tails of the tobacco should not lap over the butts of that on the tier below. Very large tobacco may be housed by alternate hanging of the sticks so that the tails hang freely between the butts of that on the lower tier.* It is also a good practice when housing to space the plants uniformly on the sticks and shake out any folded or matted leaves. This promotes free circulation of air and lessens the danger of houseburn. It is helpful also to leave a few places in the barn where one can climb up in the tobacco and inspect it frequently.

Although the tobacco plant has been cut and hung in the barn, the leaf cells are still alive and chemical changes are still taking place. These chemical changes are necessary for a proper cure and require definite temperatures. If the temperature drops below 60°, the curing process or yellowing virtually stops and the tobacco may continue to dry out but is not cured. If the temperature goes much above 100° undesirable colors may be permanently "set" and the desired color usually cannot then be obtained. Since the bottom tier is not representative of temperature up in the barn, the thermometer should be placed well up in the housed tobacco.

SOFT-CURING DARK-FIRED TOBACCO

Since the experiments conducted at the Princeton Substation have shown that there is no significant difference in the two methods of

curing, the following may be used as a guide in curing dark-fired tobacco by the "soft" or "slow" cure method.

Spacing

Give plants as much space in fire curing as in air curing. As a general rule, five or six plants may be put on each stick and the sticks spaced about 12 to 14 inches apart on the tiers. Fill the barn quickly after harvest has begun to assure even yellowing and ease in curing. It is not a good practice to house green tobacco with partially yellowed tobacco unless you plan to air-cure the first harvest until the late cutting has properly yellowed.

Yellowing

The degree of yellowing before fires are started has a direct influence on the color of the cured leaf. A brighter (brownier) color is desired on thin leaves than on heavy bodied leaves. Therefore, the body of the tobacco when put in the barn should govern the degree of yellowing before fires are started. If weather conditions will permit, yellow without using fires. If the temperature falls below 70°, add low heat to bring barn temperature to 78°-82°. If weather conditions are favorable for yellowing, delay fires under heavy-bodied tobacco until yellow spots appear. If tobacco leaves are thin, start fires when all leaves are yellowed and the ripest plants begin to color. Time required for yellowing may range from 5 to 8 days. In cool weather, very small fires may be necessary to cause tobacco to yellow properly, while in warm, wet weather, open dry fires may be needed to prevent houseburn.

Coloring

When yellowing is practically completed, brown spots will begin to appear on most of the leaves. At this stage the tobacco is ready for firing and normally all ventilators should be closed. Begin with small fires as only enough heat should be used in the coloring to bring the temperature up to 80° to 90°, depending on the outside temperature. This will usually require 6 to 8 hours. The temperature should not be allowed to exceed 100°. A relative humidity of 85 to 88 percent should be maintained until the leaf web begins to show a clear solid color.

Drying

When the tobacco on the bottom tier has turned brown, it is time to begin driving the moisture out. Gradually bring the humidity down by increasing the ventilation, and if necessary the fires, until a humidity of 78 to 80 percent is reached. These conditions should be maintained as closely as possible. The temperature during this period may vary greatly as a result of outside weather conditions; however, it should be kept at least 80° but not allowed to exceed 100°. These

conditions should be maintained until the midribs color and darken. If the moisture is driven off too fast the midribs will cure up brighter than the leaf.

Darkening Stems and Veins

If at this period the leaf has a solid color, continue with conditions as outlined under "drying." If the color is not running solid, i.e. has a greenish tinge or other off colors, allow the tobacco to come in order, and then proceed as outlined under "drying." This procedure can be repeated as many times as is necessary to obtain a solid color. In bringing the tobacco in order, if weather conditions are such that the tobacco will not come in order within 12 to 18 hours, after pulling the fires, spray the walls of the barn, the floor under the tobacco and the tails of the bottom tier if necessary to bring it in order. This can be repeated as often as necessary to get a solid color. After a solid color is obtained, proceed with temperature and humidity as described under "drying."

Careful observation should be made during this period of curing, and if mold appears on the stems the tobacco should be dried at once.

Finishing Leaf

When the stems have darkened, temperatures of 80° to 85° should be maintained for two to three weeks with a large volume of smoke. Because of weather conditions this is not always possible. Finishing tobacco is done much easier in damp weather when the tobacco is in order. For that reason, take every opportunity when the tobacco is in order, even light order, to fire it out with a heavy smoke with all the ventilators on the barn closed. During this stage of curing only about half as many fires are needed as in the first curing, and these should be very low so the tobacco will stay in order as long as possible. During this period the sawdust and barn floor are usually kept wet at all times.

As soon as firing is completed, the tobacco should be bulked down to preserve the finish and flavor, which are usually lost if the tobacco is left hanging in the barn.

CURING UNDER LESS FAVORABLE CONDITIONS

The basic principles of curing do not change and every effort should be made to adhere to these principles. There are no substitutes for ripe tobacco, proper wilting and a tight barn. Tobacco should be yellowed at a temperature of 75° to 80°. It should be colored at a temperature of 80° to 95°. Drying may be done at higher temperatures if necessary but not over 100°.

Curing in Warm Weather

Dark tobacco harvested in late August or early September should be wilted well before housing is begun. Yellowing is usually very

rapid in warm weather and fires should ordinarily be started by the fifth day after housing. Small fires should be used in coloring and when using sawdust it should not be wet unless the tobacco begins to dry too fast. Close observation is necessary, as sweating is a serious problem in warm-weather curing. It may be necessary under these conditions to keep the top ventilators open continuously and to use the lower ventilators periodically to maintain the correct temperature and humidity. During the drying process it may be necessary to open all the ventilators and to maintain a low fire to drive out the moisture. Less fire is needed in warm weather to attain the desired temperature, and careful attention should be given to avoid overheating. Tobacco will mold very quickly in warm weather and special attention should be given to the crop during the darkening of the stems, especially when the fires have been withdrawn.

Curing in Cold Weather

It is very difficult to obtain a desired color in cold weather. The leaf does not stay in order long enough to reach a desired color and often the result is green, yellowish, or mottled colors. Under such conditions the tobacco should be yellowed with low heat and some smoke. The temperature should be raised to 70° to 75°. When yellowing is completed the temperature should be increased to 80° to 90° to induce coloring. With the increased temperature, the tobacco will tend to dry out. All ventilators should be closed and wet sawdust should be used on the fires. This method produces a moist smoke and aids greatly in keeping tobacco in order. In more severe cases, where the above practice fails to retain the order, spraying the lower tier may be helpful. If spraying is practiced, it must be done at frequent intervals and continued until a desired color is obtained. When the tobacco has colored, the standard practice of curing can be followed.

Curing in Wet Weather

Wet weather is not objectionable, as the moisture helps to keep the tobacco in order longer, but if the weather is warm as well as wet, the humid air is very conducive to houseburn and sweat, and the tobacco should be given careful attention and regular and frequent inspection. The operation of the top ventilator will usually control the relative humidity, provided the basic principles of curing are followed. If the humidity in the barn becomes too high the bottom ventilators can be opened and the air circulation increased. Contrary to popular belief, this practice does not allow more moisture to enter the barn. It does, however, increase circulation and as the air is heated in the barn it takes up moisture from the crop and carries it out. Warm air will hold more moisture than cold air.

Bulking

When conditions become favorable, open the barn to allow moist air to circulate until the tobacco is in good handling order to bulk down. The bulk should not be too large and should be made somewhere near the center of the barn. Avoid bulking directly on the ground by using a foundation of poles or tobacco sticks. Bulk the tobacco with the butts on the outside and the tips overlapping in the middle. When completed, the bulk should be covered with a wagon sheet, old quilts or blankets, or similar material. This will usually prevent the tobacco from drying out. If the bulk is made properly and examined frequently, there should be little or no danger of it overheating or damaging before it is stripped.

Stripping

Stripping is the most important part of preparing the crop for market. The idea is to bring together leaves of similar characteristics in accordance with the use of each particular grade. The rather small ground leaves at the bottom of the plant make up grades known as *Lugs*. The *Thin Leaf* grades or *Seconds* are composed of fairly sound leaves of good size but lacking in body or fill. The *Heavy Leaf* grades are the large, heavier bodied leaves that generally represent about 60 percent of the crop in a good season. The *Tip* grades are leaves that are under 16 inches in length. These short leaves should always be separated from the other leaf grades.

Tie the hands of tobacco neatly as this adds to the appearance of the leaf on the warehouse floor. Usually 6 to 8 leaves are tied in each hand of dark-fired tobacco. Dark air-cured, both Green River and One Sucker, should be tied in hands of 15 to 20 leaves. The tied hands of tobacco should be kept separated by grades and bulked at the end of each day's stripping. Each grade should be bulked separately by placing the tobacco, one hand at a time, in a single layer across the entire length of the bulk. The procedure is then repeated for additional layers. These practices will improve the appearance and preserve the quality of dark tobacco.

In addition to these suggestions for improving upon the stripping and sorting of tobacco, it is suggested that each grower attend the stripping and sorting demonstrations conducted in all counties by the Tobacco Grading Service, U.S.D.A. Consult your county agricultural extension agent for time and location.

Lexington, Kentucky

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