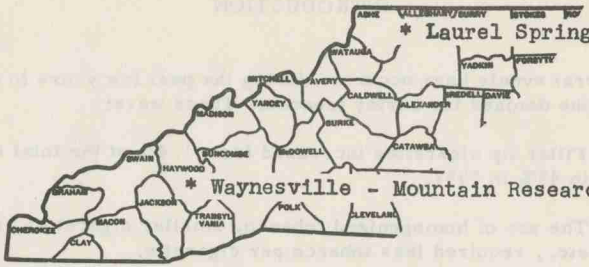
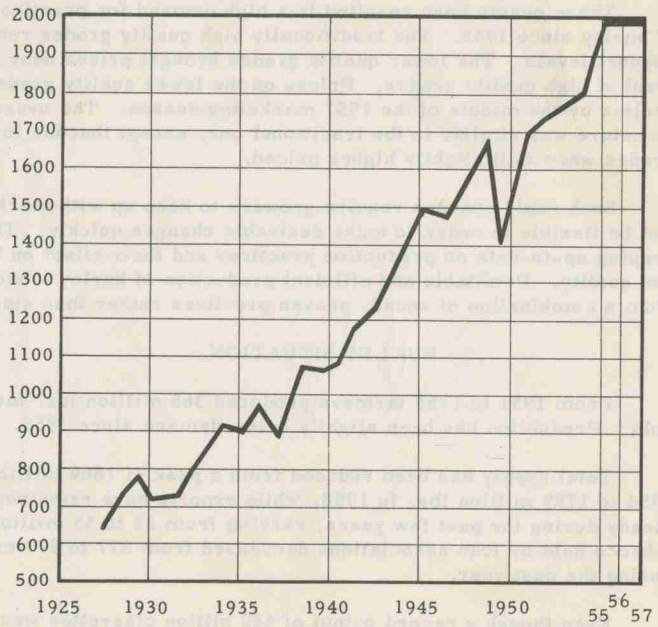
Successful Production of Burley Tobacco



Burley Tobacco Research is Conducted at Two Research Stations Located Above

Yield Per Acre

Burley Tobacco - N. C. 1928 - 1957



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INTRODUCTION

Several events have occurred during the past few years to strongly influence the demand for burley tobacco. These were:

1. Filter tip cigarettes increased from 1.4% of the total in 1952 to 43% in 1957.

2. The use of homogenized tobacco, smaller cigarettes, size, etc., required less tobacco per cigarette.

3. The health scare reduced cigarette consumption from 434 billion cigarettes in 1952 to 402 billion in 1954. Consumption increased to a record high of 442 billion cigarettes in 1957.

4. Production and demand for tobacco both have decreased. Production greatly exceeded demand through 1954. Recent decreased acreages have brought production slightly below demand.

These events have resulted in a high demand for practically all grades of burley since 1955. The traditionally high quality grades remained near support levels. The lower quality grades brought prices near the support level of high quality grades. Prices on the lower quality grades began to decline by the middle of the 1957 marketing season. The overall price structure was similar to the traditional one, except that the lower quality grades were still slightly higher priced.

Such rapid changes require growers to keep up with market demand and be flexible in order to make desirable changes quickly. This requires keeping up-to-date on production practices and their effect on both yield and quality. Profitable and efficient production of burley tobacco results from a combination of sound, proven practices rather than single practices.

BURLEY SITUATION

From 1951 to 1955 farmers produced 365 million lbs. more than was sold. Production has been slightly below demand since 1955.

Total supply has been reduced from a peak of 1866 million lbs. in 1954 to 1789 million lbs. in 1958, while exports have remained fairly steady during the past few years, varying from 28 to 35 million lbs. The tobacco held by loan associations decreased from 377 to 277 million lbs. during the past year.

Even though a record output of 442 billion cigarettes was established in 1957, domestic sales of 480 million lbs. and total sales of 508 million

lbs. were the lowest in ten years. The changes described in the previous section have made it possible to manufacture 360 cigarettes per lb. of tobacco in comparison with 325 in 1952.

PLANT BEDS

Rate of Seeding

The seeding rate of plant beds is important in determining the number of suitable plants available for transplanting and their survival in the field. Also, to some extent, it determines the yield and quality of tobacco produced. One ounce of burley tobacco seed contains from 350,000 to 400,000 seed. This is sufficient to supply plants for 30 to 40 acres if a plant could be produced from each seed.

Tests show that 1/4 to 1/6 oz. of seed per 100 square yards produces good quality plants with good plant bed management. Good management includes adequate moisture at seed germination time, good disease and insect control, etc.

TABLE I - RATE OF SEEDING TEST
Waynesville 1954-1957

Seeding Rate Per 100 sq. yd.	Number of plants per square yard				% survival in field 1st pulling
	1st pulling	2nd pulling	3rd pulling	Total	
1/32 oz.	15	20	8	43	98.3
1/16 oz.	50	35	14	99	93.9
1/8 oz.	62	48	25	135	90.1
1/4 oz.	93	94	56	243	86.0
3/8 oz.	115	114	75	301	81.0
1/2 oz.	139	115	95	349	80.5
5/8 oz.	131	116	119	366	78.9
3/4 oz.	129	144	103	376	71.5
1 oz.	113	126	142	381	73.2

BURLEY VARIETIES

Present varieties of burley tobacco produce about the same yield and value per acre or value per pound on disease-free soils. See Table II. Selection of a variety will depend on demand, disease resistance, grower preference and grower's past experience.

Growers may expect new varieties to be released during the next few years which have multiple-disease resistance as well as high yielding ability. It is expected that multiple-disease resistant lines will replace many of our present varieties.

TABLE II - BURLEY VARIETY TESTS 1953-1956

Waynesville and Laurel Springs, N. C.

Variety	Number of Comparisons	Acre Yield	Acre Value	Value per 100 pounds	Resistance to /1
Ky. 16	8	2130	939	$44.08	B.R.R.
		Percent	Percent	Percent	
Ky. 35	6	108	108	100	F., M., B.R.R.
B - 1	6	97	103	106	B.R.R.
B - 2	8	105	113	108	B.R.R.
B - 11A	8	101	105	104	F., Bs, B.R.R.
B - 11B	8	99	104	105	F., Bs, B.R.R.
B - 21	8	108	114	105	M., Wf, B.R.R.
Va. B-29	2	96	104	108	M., B.R.R.

/1 B.R.R. = Black Root Rot; F = Fusarium Wilt; M = Mosaic; Bs = Black Shank; Wf = Wildfire.

DATE OF TRANSPLANTING

A survey conducted a few years ago showed that there was a wide variation in the date burley tobacco is transplanted in North Carolina. The results of the survey pointed out what most growers have observed over the years: The earlier tobacco is transplanted (after the danger of frost is past) the higher the yield. These data are presented in Table III below. Tobacco that is set fairly early is generally better quality. The earlier tobacco tends to be a little heavier in body.

There are several reasons for improved yield and quality of early set tobacco over late set tobacco: (1) The tobacco can be allowed to become fully mature before harvesting without danger of frost, (2) it is ready for harvest earlier in the season when curing conditions generally are more favorable, and (3) weather conditions usually are more favorable for stand establishment and continuous growth during the early part of the season.

TABLE III. EFFECT OF PLANTING DATE ON YIELD OF BURLEY TOBACCO

A Sample of N. C. Farms by Counties

Planting Date	Number of Farms	Av. Yield/Acre
May 1 - June 1	15	1852 lbs.
May 15 - June 15	50	1810
June 1 - July 1	62	1654
June 15 - July 15	19	1597

SPACING

Spacing studies conducted during the past four years as part of the burley fertilization tests (Table IV) indicate that close spacing may increase yields but may lower quality. Several things should be pointed out in connection with the data presented below:

1. The tobacco was primed at least once, thereby saving all the bottom leaves, most of which likely would have been lost in the closer spacings without priming.

2. The tobacco was allowed to become fully ripe, thereby increasing quality and quantity.

3. Values were computed by using official U. S. Government grades and support prices.

While closer spacing may in some cases increase total yield, the leaves tend to be shorter in length and width, and have less body, finish and desirable color. Pink color also is closely associated with close spacing as is the loss of the bottom leaves if priming is not practiced.

Suggested spacing is 14 to 18 inches in 3 1/2 to 4 foot rows.

TABLE IV. RESULTS OF SOME SPACING EXPERIMENTS,

Waynesville & Laurel Springs, 1956

Spacing in Row	Yield/A	Value/A	Value/cwt.
12"	2352	$1037	$44.09
15"	2196	984	44.81
18"	2102	921	43.82

FERTILIZATION

Fertilization tests over a period of years have indicated that burley tobacco requires about 90 - 110 lbs. nitrogen, 70 - 90 lbs. of P_2O_5, and 90 - 110 lbs. of K_2O per acre for the production of good yielding, quality tobacco. Slightly higher yields of tobacco may be obtained by increasing the rate of nitrogen but quality may be lowered.

The basic fertility requirement may be furnished in a number of ways, depending on whether the grower uses cover crops or legumes and whether good stable manure is available.

The data in Table V shows the influence of varying rates of nitrogen with and without manure. These data indicate that the addition of reasonable quantities of manure has a favorable influence on quality as long as the total nitrogen required for good production is not exceeded.

Application of stable manure in excess of 10-15 tons per acre may result in excessive chlorine, which causes tobacco to become soggy and dull in color. This is frequently responsible for tobacco becoming too high in order and grading wet on the market.

TABLE V. SOME RESULTS OF BURLEY FERTILIZATION TESTS - 1956

Waynesville and Laurel Springs

Rate of Fertilization								
Manure/A	Nitrogen/A	P_2O_5/A	K_2O/A	Yield/A	Value/A	Value/cwt.	% Nicotine	% Chlorine
Tons	Lbs.	Lbs.	Lbs.	Lbs.				
0	0	0	0	2023	$905	$44.26	3.14	1.15
0	48	48	48	2204	963	43.42	3.63	.79
10	0	0	0	2412	1093	45.14	3.52	1.96
10	48	48	48	2640	1176	44.22	3.64	1.75
0	96	96	96	2531	1164	45.84	3.71	.63
20	0	0	0	2669	1192	45.36	3.88	2.50
20	48	48	48	2944	1324	44.73	4.37	2.14

Since manure loses its fertility value very rapidly after spreading in the field, it should be plowed under or disked into the soil immediately after spreading. The results of demonstrations shown in Table VI point out the effects of waiting short periods before incorporating manure into the soil.

TABLE VI. MANURE DEMONSTRATION RESULTS - 1955-1957

10 Tons Manure - No Fertilizer

Treatment	Yield/Acre (lbs.)	Value/Acre	Value/cwt.
1. Manure disked immediately	2162	$1306	$60.41
2. Manure disked 5 days later	1810	1099	60.72
3. No manure	1396	826	59.17

CONTROL BURLEY DISEASES

Tobacco diseases reduced the value of the burley crop an estimated 2.8% in 1957. This amounted to a loss of $310,000 for burley growers.

There are several diseases that attack burley tobacco, including wildfire, mosaic, black shank, diseases caused by nematodes, fusarium wilt, and several root and leaf diseases.

Best control can be obtained by planning and following a complete control program. The first step in such a program is to find out what kind of diseases are present in your field. This must be done during the growing season. The second step involves obtaining information on control from your county agent, agricultural teacher, or other agricultural worker. Here are a few points that may help you in planning a complete control program for your next crop.

Wildfire

This disease can be controlled by using a resistant variety or by chemical treatment.

1. Resistant variety. Burley 21 is highly resistant to wildfire. If this variety is planted, chemical treatments for control are not necessary.

2. Chemical treatments. Both the bluestone-lime mixture (Bordeaux) and the streptomycin sulfate treatment should control wildfire in the plant bed if applied as recommended. However, streptomycin sulfate is more effective than the bluestone-lime mixture.

Applying the bluestone-lime mixture. Treat the bed two or three times with 3-4-50 bluestone-lime mixture (Bordeaux) at the rate of one quart per square yard. First treatment should be applied early, when plants are in the two-leaf stage. A second treatment should be applied 10 days later. If the disease is active in surrounding beds, continue to apply treatment every ten days. Also, if beds are hand weeded, treat immediately after weeding.

Applying the streptomycin sulfate treatment. This treatment can be applied as a spray (200 PPM) at the rate of five gallons to a 9 by 100 foot bed or as a drench (100 PPM) at the rate of 10 gallons to a 9 by 100 foot bed. The spray method of application has been found to be most effective. The first treatment should be applied early when the plants are in the two-leaf stage. Continue to put on one application each week until a total of five treatments have been applied to the bed.

Blue Mold, Anthracnose and Damping-off

The same treatments recommended for control of blue mold will also control anthracnose and go a long way toward reducing the severity of damping-off. However, in order to get control of both blue mold and anthracnose and reduce damage from damping-off, it is important to follow recommendations in applying treatments.

Applying treatments. Treat beds twice a week and after rains, starting when plants are about the size of a dime. Use fungicides containing ferbam (Fermate, Nu Leaf, Ferradow), zineb (Dithane Z-78, Parzate) or maneb (Manzate, Dithane M22). Use the concentrate material for the spray treatment (ferbam - 4 lbs./100 gals. of water or five level tablespoonfuls per gallon; Maneb - 1/2 lb./100 gals. water or one level teaspoonful per gallon). Use a ready mixed dust for the dust treatment (11.4% ferbam, 6.5% zineb or 1.4% Maneb).

Tobacco Mosaic

Mosaic is one of the oldest known tobacco diseases. The results from research tests indicate that losses may exceed 300 lbs. per acre when plants become infected early in the growing season. Mosaic also reduces quality of tobacco. This disease can be controlled by resistant varieties or sanitation practices and to some extent by rogueing.

1. Resistant varieties. Burley 21, Kentucky 35 and 57, and Virginia B-29 mosaic. In field performance, Burley 21 has been outstanding and compares favorably with Ky. 16.

2. Sanitation. If resistant varieties are not used, it is advisable to follow certain sanitation practices in order to keep mosaic out of the bed site and prevent spread during the early part of the growing season. Follow these sanitation practices.

a. Do not use tobacco scrap on tobacco plant beds or fields.

b. Destroy all weeds around the plant bed site in the early fall.

c. Plant seed that have been thoroughly cleaned and that are free of trash.

d. Do not use manufactured tobacco products or natural leaf while working in the plant bed or while transplanting the crop to the field. If tobacco is used, wash hands with soap and water before going back to work since this removes the tobacco mosaic virus.

e. At the end of the transplanting season, destroy the remaining plants by plowing or disking. Sow a cover crop, such as crotalaria or soybeans, to prevent weed growth during the summer.

f. Destroy all tobacco crop refuse immediately after harvest by cutting stalks and disking.

3. Rogueing. The practice of checking the fields and taking out plants showing symptoms of mosaic disease is called rogueing. Rogueing during the early part of the growing season will retard the spread of the disease through the field following cultivation, hoeing and other field operations. Even so, rogueing is not advisable if more than 1 per cent of the plants are infected.

TOPPING AND SUCKER CONTROL

The data in Table VII indicate that topping and suckering increase yields and quality considerably over not topping. Yields are increased by topping in the button stage or early bloom stage; however, this practice increases the nicotine content considerably. Quality is increased without seriously affecting yield by topping and leaving the two top suckers until harvest.

Sucker control methods other than hand suckering were included in these tests. These included treating the plants with oil emulsion and MH-30. Oil emulsions have not generally given satisfactory results in the burley area because of their tendency to cause leaf drop and stalk rot during rainy weather or high humidity conditions.

MH-30, while giving satisfactory sucker control, has lowered the per cent nicotine, increased the per cent moisture equilibrium, i. e., made the tobacco wet natured and soggy, and tended to make the tip grades darker in color. An expanded research program on the effects of MH-30 on tobacco quality has been initiated.

TABLE VII. BURLEY TOPPING AND SUCKER CONTROL STUDIES

Waynesville 1954-1957

Topping Treatment	Sucker Control Treatment	Yield/A /1	Value/A /1	Value/lb. /1	Nicotine /2	Equil. at 60% R. H. /3	Strip Yield /3
		Lbs.			%	%	%
Not topped	Not suckered	2110	$1128	$47.52	2.54	11.1	71.0
Not topped	Hand suckered	2503	1175	46.60	2.75	11.3	70.6
Not topped	MH-30	2637	1238	46.30	3.47	11.9	69.7
Button stage	Hand suckered	2676	1282	47.70	3.84	11.4	71.7
Button stage	MH-30	2793	1314	46.56	3.04	12.0	68.4
25% bloom	Not suckered	2523	1198	47.21	3.34	11.2	70.4
25% bloom	2 top suckers left	2528	1246	48.88	3.63	11.0	70.3
25% bloom	Hand suckered	2704	1270	46.65	4.13	11.2	71.7
25% bloom	MH-30	2775	1332	47.29	3.57	11.8	68.6
25% bloom	Oil emulsion	2646	1279	48.00	3.79	11.8	70.8
Late bloom	Hand suckered	2457	1111	44.95	3.31	11.1	69.9
Late bloom	MH-30	2588	1194	45.87	2.97	11.5	69.9

/1 1954 - 1957

/2 1954 - 1956

/3 1956

HARVESTING

Burley tobacco in North Carolina is generally all stalk cut when slightly immature. Very little priming is done by the average grower. Recent harvesting experiments at the Waynesville Station (see Table VIII below) indicate, however, that priming the bottom three to six leaves or waiting until the plant is fully mature even without priming will increase both yield and value per acre. Yields and value per acre are maximized by priming. As shown in the table, the increase is almost entirely from the lower 1/5 of the plant.

Even though tobacco may fire up at the bottom of the plant during dry weather shortly before normal harvesting time, the data indicate that it may be better to wait until the tobacco is fully ripe before cutting rather than cutting immediately, especially when market demand emphasis is on the up-stalk tobacco. While some loss of the bottom leaves may be experienced by following this procedure, the loss may be more than offset by the increase in the middle and upper part of the stalk, plus a higher quality tobacco, if rains come later in the season. An even better procedure would be to prime and then cut when the tobacco is fully ripe.

TABLE VIII. HARVESTING TESTS

Waynesville 1954 - 1957

Treatment	Lower 1/5 of plant		Upper 4/5 plant except dark leaf and tips.		Dark leaf & tips from upper 4/5 plant		Total Entire plant		Value/ cwt.
	Yield/A	Value/A	Yield/A	Value/A	Yield/A	Value/A	Y/A	V/A	
	lbs.		lbs.		lbs.		lbs.		
1. All stalk cut when slightly immature.	207	$101	1115	$600	551	$179	1873	$880	$46.98
2. Lower 1/5 primed slightly immature Balance stalk cut same time No. 1	447	224	1207	667	513	174	2166	1065	49.17
3. Lower 1/5 primed when ripe-balance stalk cut when fully ripe	439	210	1248	681	540	172	2227	1063	47.73
4. All stalk cut when fully ripe	197	102	1261	677	625	194	2083	973	46.71