

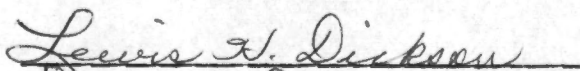
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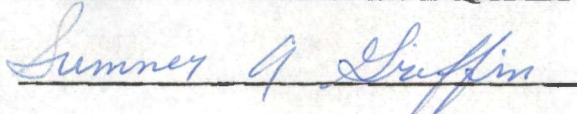
I am submitting herewith a thesis written by W. Clyde Webster entitled "Development of an Extension Approach to Teaching Recommended Practices to Burley Tobacco Producers in Trousdale County, Tennessee." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Extension.


Major Professor

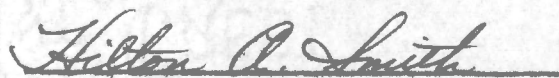
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Accepted for the Council:


Dean of the Graduate School

DEVELOPMENT OF AN EXTENSION APPROACH TO TEACHING RECOMMENDED
PRODUCTION PRACTICES TO BURLEY TOBACCO PRODUCERS IN
TROUSDALE COUNTY, TENNESSEE

A Thesis
Presented to
the Graduate Council of
The University of Tennessee

In Partial Fulfillment
of the Requirements of the Degree
Master of Science

by
W. Clyde Webster

June 1964

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CHAPTER I

INTRODUCTION

The Trousdale County Agricultural Extension Advisory Committee, the Trousdale County Agricultural Agent, and the Tennessee State Agronomy Leader in 1961 set as a long-time program objective, the production of an average of 2,000 pounds of quality tobacco per acre by Trousdale County tobacco producers.

The Trousdale County five-year average (1957-1961) yield in pounds produced per acre was considerably below the State average; yet tobacco accounts for 43 per cent of the total farm income in Trousdale County.

I. IMPORTANCE OF TOBACCO

In 1959, there were 648 farms in Trousdale County. Of this number, 505 grew a total of 1,137 acres of tobacco (12:250-251).*

Tobacco, livestock and dairying are the three principal farm enterprises in the county.

The county gross sales from tobacco in 1959 were \$2,000,000. Sales in other recent years have been similar.

Hartsville is the county seat of Trousdale County. Buyers representing the major tobacco companies buy the county tobacco at

* Numbers in parentheses refer to numbered references in the bibliography; those after the colon are page numbers.

local warehouses each marketing season. Five locally-owned auction barns or "floors" are available to sell tobacco grown in Trousdale and nearby areas. A total of 8 million pounds was sold through the warehouses in 1963.

Tobacco is Tennessee's second most valuable crop. In 1963 tobacco growers received \$90,000,000 from the sale of four types of tobacco grown in the State. Burley tobacco accounted for approximately 80 per cent of the total (1:8).

II. NEED FOR THE STUDY

Forty-three per cent of Trousdale County's total farm income was derived from the sale of burley tobacco in 1959, yet at the same time, Trousdale County's average yield per acre was 276 pounds under the state average.

In 1961 the Trousdale County Agricultural Extension program development committee set as a long range objective the production of an average of two thousand pounds of quality tobacco per acre by 1965. It was estimated that this would raise the farm income roughly by \$275,000.

Trousdale County's median farm family income in 1959 was \$2,189 compared with the state median of \$2,222 and the United State's median of \$3,228 (6:70,71,85). Hence, the need to determine possible reasons for the relatively low tobacco production in the county and to make plans to take educational steps aimed at raising production and income. A review of available literature indicated

that no previous study had been done by way of developing (planning, conducting and evaluating) a suggested Extension intensive teaching approach for use with tobacco growers in local counties. To this end the present study was designed.

III. PURPOSES OF THE STUDY

This study was made, then: 1) to determine present production levels and identify production practices of tobacco producers in Trousdale County and use data as a basis for formulating an educational approach for use in teaching research-verified tobacco production practices to growers in Trousdale County, and 2) to use and evaluate the educational approach.

CHAPTER II

REVIEW OF LITERATURE

The main purpose of the Cooperative Extension Service as stated in the Smith-Lever Act, is ". . . to aid in the diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics, and to encourage the application of the same . . ." (5:5).

I. PREVIOUS RESEARCH RELATED TO TOBACCO

PRODUCTION PRACTICES

Much research has been done and reported on burley tobacco cultural practices, but comparatively little has been written on the teaching of research-verified burley tobacco production practices to adult farmers.

Lowe interviewed a stratified random sample of 144 tobacco growers in a Tennessee county to secure data in regard to family, personal, soil type, soil test and production factors. The following conclusions were drawn: 1) most farmers did not recognize the low tobacco yield situation and the potentially high-yield opportunities available through use of recommended practices; 2) most farmers in the county were not properly fertilizing their tobacco based on soil test recommendations; 3) most farmers in the county were not properly topping tobacco and controlling suckers; 4) most negroes

and most women farm owners needed special attention if they were to be expected to efficiently produce tobacco, and 5) more Extension program emphasis needs to be placed on encouraging the adoption of recommended tobacco production practices (5:74-75).

II. PRINCIPLES OF ADULT TEACHING AND LEARNING

Requirements for Teaching

According to Mursell successful teaching is teaching that brings about effective learning. The decisive question is not what methods and procedures are employed, or whether they are old-fashioned or modern, time-tested or experimental, conventional or progressive. All such considerations may be important, but none of them is ultimate, for they have to do with means, not ends. The ultimate criterion for success is--results! (7:1).

Mursell also calls attention to six principles of successful teaching, namely, 1) context--teaching is best done in the proper setting, 2) focus--pivotal points (like recommended practices such as fertilizing based on soil tests) should be clear, 3) sequence--proper background, seasonal sequence, level of previous learning related to tobacco production should be considered, 4) individualization--tobacco growers are individuals and some need special help, 5) socialization--tobacco growers are resource people since they have grown tobacco--they should learn from participation and sharing, 6) evaluation--results should be made known to them so they can see improvement.

Requirements for Learning

Wilson and Gallup say that of the many requirements for learning four have important application to Extension. They state that 1) adults learn most rapidly when they have a strong

desire to learn. When people come to Extension wanting information and assistance on problems they already have a desire to learn. These are the people easiest to teach. 2) Adults learn best when they have clear goals--no one can act to the best purpose until he has definitely decided what he wants to do. When the learner realizes what he needs to learn in order to accomplish what he wants, he is well on the way with the learning process. 3) Adults learn best when they put forth an effort to learn, therefore, a third requirement in the learning process is to put forth effort. Learning is an individual matter. No other person can learn for you. People develop skills, habits and problem solving ability by practice. A tobacco grower has not learned a recommended skill because he tried it; he has learned if he continues the practice. 4) Adults learn best when they receive satisfaction from what they have learned. It is well known that learners seek success in what they do and that they tend to avoid situations which frustrate them. They learn best when there is a reward in terms of a need satisfied or a feeling of accomplishment. A tobacco farmer who receives more net income per acre as a result of fertilizing according to soil test recommendations is likely to continue this practice.

Effects of Age on Learning

Knowles points out that adults who engage in learning activities throughout a life-time lose very little of this intellectual ability. He says that two significant conclusions

can be drawn from the facts about mental development: first, that adults can learn throughout life, hence they can take part profitably in adult education and, secondly, that adult education can help them to retain their intellectual power for throughout life (3:18).

III. TENNESSEE COUNTY EXTENSION PROGRAM DEVELOPMENT

The Cooperative Extension Service, as provided in the Smith-Lever Act of 1914, has as a fundamental objective the development of people to the end that they may learn or evermore wisely solve their major problems in the area of program emphasis in which Extension has legal responsibility including: 1) efficiency in agricultural production; 2) efficiency in marketing, distribution, and utilization; 3) conservation, development and use of natural resources; 4) management on the farm and in the home; 5) family living; 6) youth development; 7) leadership development; 8) community improvement and rural areas and resource development, and 9) public affairs. The basic unit for Extension work is the county, and a staff is assigned in each county to develop an on-going and effective Extension program (11:67).

County Extension program development is seen to consist of several interrelated processes, including: 1) program projection; 2) annual Extension planning; 3) Extension teaching, and 4) Extension evaluation and reporting (11:53). Regardless of the amount of time spent on Extension program planning all may be

useless unless carried out in the county, and teaching effectively done; therefore, the success or failure of the County Extension program efforts in a given year depends on how well the job is done in the county by the local Extension staff (11:54).

The county Extension program is the sum total of all Extension work done in the county, including plans and planning, carrying out of long-range and annual plans, and evaluation and reporting of progress made toward objectives in light of conditions giving rise to them. There is one county Extension program in each county consisting of all activities in those program areas which may be appropriate for emphasis in that county (11:67).

IV. EDUCATIONAL TEST CONSTRUCTION

Ross, in discussing the earmarks of a good test, states that it is important to know what to look for. There is usually a choice among many possibilities which are very unequal in merit (9:67).

Ross also says that satisfactory measuring instruments have three indispensable qualities. These are: 1) validity, 2) reliability, and 3) usability (9:72).

Validity means the degree to which the test or instrument measures what it claims to. Validity means truthfulness.

The term reliability means the degree to which the test agrees with itself. To what extent can two or more forms of the test be relied upon to give the same results when repeated under

the same conditions? Reliability is concerned with only the consistency of a test, and has nothing to do with the truthfulness of the measurement, according to Ross (9:90).

The third important characteristic of a measuring instrument is usability. Ross points out that this means the degree to which the instrument can be used successfully by classroom teachers and administrators without undue expenditure of time and energy (9:97). Factors determining usability are: 1) ease of administration; 2) ease of scoring; 3) ease of interpretation and application; 4) low cost, and 5) proper mechanical make-up.

Fifty items may be set as a minimum, when constructing a true-false test, according to Ross (9:147). The scoring technique of taking the number of right questions minus the number of wrong questions is used to account for the guessing factor.

CHAPTER III

METHODS AND PROCEDURES

I. SCOPE OF THE STUDY

The study consisted mainly of a production practice random sample survey of 108 Trousdale County tobacco farmers and development of a related Extension teaching approach. Twenty-one per cent of the burley growers in Trousdale County were interviewed in the survey. Measuring devices were used at the beginning and at the close of the series to evaluate the effectiveness of the approach.

II. NULL HYPOTHESES

Two null hypotheses (2:229) were selected for testing in the study, including: 1) there is no difference between scores made by tobacco growers before and after intensive teaching as measured by a General Principles of Tobacco Production True-False Test, and 2) there is no difference between scores made by tobacco growers before and after intensive teaching as measured by a Recommended Tobacco Production Practice Checklist.

III. THE SAMPLE SURVEY

Sampling

Records of the Trousdale County Agricultural Stabilization

and Conservation Service office were used to determine the five-year average per acre yield of tobacco in Trousdale County for the five-year period 1957 through 1961. Farms with less than 0.5 acre allotment were excluded from the study, as were farms that changed hands during the study period.

A frequency distribution of growers by yield groups was made from which stratified samples of growers were selected. As seen in Table I, the twelve 100-pound tobacco yield intervals in the frequency distribution chart was classified under four major yield groups: 1) considerably below average (below 1,300 pounds per acre); 2) below average (1,300-1,599 pounds per acre); 3) above average (1,600-1,899 pounds per acre), and 4) considerably above average (1,900 or more pounds per acre). Twenty-seven names were drawn randomly from each of the four major yield groups for a total sample of 108 from the population of 555 county tobacco growers eligible for the study.

Pertinent tobacco production data were secured by means of personal interviews with the 108 selected growers. All growers interviewed were cooperative in answering all questions asked.

Interviews were made between April 1 and December 15, 1963. Data were obtained in each case from the farm owner, operator or sharecropper. The same schedule was used with all interviews by the same interviewer.

TABLE I

DISTRIBUTION OF TOBACCO PRODUCERS BY FIVE-YEAR AVERAGE TOBACCO
YIELDS PER ACRE (IN 100 POUND INTERVAL), AND NUMBER OF
GROWERS AND NUMBER SAMPLED IN EACH INTERVAL, FOR
TROUSDALE COUNTY, TENNESSEE,
1957 THROUGH 1961

5-Year Average Yield Per Acre, Lbs.	Number of Growers	Number Sampled
CONSIDERABLY BELOW AVERAGE GROUP		
Below 1,100	41	9
1,100-1,199	23	9
1,200-1,299	38	9
BELOW AVERAGE GROUP		
1,300-1,399	44	9
1,400-1,499	75	9
1,500-15,99	70	9
ABOVE AVERAGE GROUP		
1,600-1,699	83	9
1,700-1,799	59	9
1,800-1,899	50	9
CONSIDERABLY ABOVE AVERAGE GROUP		
1,900-1,999	33	9
2,000-2,099	24	9
2,100 and above	15	9
TOTAL	555	108

The Interview Schedule

Only six kinds of personal data were asked for in the interview schedule (see Appendix A), including: 1) race and sex of farm owner; 2) size of farm; 3) managerial responsibility; 4) age; 5) educational level, and 6) major source of income. The schedule was patterned after one developed by Lowe (5:80) who conducted an earlier study with tobacco growers in a Tennessee county (see Appendix A).

Data were obtained concerning 36 individual production practices or factors known to influence yield differentials. These included blackshank data, soil type, tons of manure applied per acre, fertilizer placement, pounds and analysis of plant bed fertilizer, method of plant bed sterilization, time of plant bed sterilization, variety of tobacco used, rate of seeding plant bed, plant bed weed infestation, quality of plants, plant bed insecticides used, degree of insect control in plant bed, transplanting method, date transplanted, rotation system followed, kind of cover crop used, depth of cultivation, spacing in field, uniformity of stand, topping (when and how), sucker control methods used, disease and insect damage in field, stage of harvest, time of harvest after topping, priming data, farmer's reason for high, low or no higher yield and number of grades or groups made when stripped.

Results of the Survey

Of the 555 tobacco growers in the population, 19 per cent were in the considerably below average (under 1,300 pounds per acre) yield group, 33 per cent were in the below average (1,300-1,599 pounds per acre) yield group, 35 per cent were in the above average (1,600-1,899 pounds per acre) yield group and 13 per cent were in the considerably above average (1,900 or more pounds per acre) yield group. Twenty-seven growers were selected for interview in each of the four yield groups by stratified random sampling techniques.

Personal and Farm Data

Race and sex. Reference to Table II shows that 93 farms (86 per cent) were owned by males and 15 (13.8 per cent) were owned by females. Eighty-eight (81.4 per cent) of the farms were owned by white men, 15 (13.8 per cent) by white women, 5 (4.8 per cent) by negro men and none by negro women.

Four of the five negro farm owners were in one of the two below average groups (three in the considerably below average group and one in the below average group) and the other one was in the above average group. None were in the considerably above average group.

Also, 13 of the 15 women farm owners had below average yields, two were in the above average group, and none in the considerably above average group. There was a tendency for larger

TABLE II
RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO RACE AND SEX OF FARM OWNERS OF 108 SELECTED FARMS IN TROUSDALE
COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	All Farm Owners						White Farm Owners						Negro Farm Owners					
	Total			Male			Female			Total			Male			Female		
	No.	Cent	Per	No.	Cent	Per	No.	Cent	Per	No.	Cent	Per	No.	Cent	Per	No.	Cent	Per
Considerably below average (below 1,300 lbs. per acre)	27	25.0	20	16.5	7	6.5	7	6.5	24	22.2	17	15.7	7	6.5	3	2.8	0	---
Below average (1,300 - 1,599 lbs. per acre)	27	25.0	21	19.4	6	5.5	6	5.5	26	24.1	20	18.5	6	5.6	1	0.9	0	---
Above average (1,600 - 1,899 lbs. per acre)	27	25.0	25	23.1	2	1.9	2	1.9	26	24.1	24	22.2	2	1.9	1	0.9	0	---
Considerably above average (1,900 or more lbs. per acre)	27	25.0	27	25.0	0	---	0	---	27	25.0	27	25.0	0	---	0	---	0	---
Total Study	108	100.0	93	86.1	15	13.9	15	13.9	103	95.4	88	81.5	15	13.9	5	4.6	0	---

percentages of white male owners to be in the above average groups than was true with women and negroes.

Size of farm. Table III shows that 59 of the 108 farms were below 100 acres, 41 were between 100 and 200, and 8 were over 200 acres in size. About 27.8 per cent of the farmers on farms of less than 100 acres were in the below average group; whereas only 19.4 per cent of those on the 100-200 acre farms were below average. There seems to be no clear relationship between farm size and per acre yield.

Tenure status. Tobacco was grown by owners on 49 of the 108 farms, by sharecroppers on 59 and by tenants in no cases, as shown in Table IV. A higher percentage of the owners growing tobacco fell in the two above categories (about 55 per cent) than was true with sharecroppers growing tobacco (about 46 per cent).

Age. Reference to Table V reveals that 14 (13 per cent) of the 108 farmers interviewed in this study were below 40 years of age. Sixty-one (57 per cent) were between 40 and 60 years of age; while 33 (30 per cent) were over 60. No trend was shown relating yield levels to any definite age category.

Educational levels. Data with regard to educational levels of tobacco growers in Trousdale County as associated with different yield levels as shown in Table VI. Seventy-three of the farmers interviewed (67.5 per cent) had less than a ninth grade education.

TABLE III

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO SIZE OF FARM IN ACRES, OF 108
SELECTED FARMS IN TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	Size of Farm, Acres							
	Total		Below 100		100 - 200		Over 200	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	19	17.6	8	7.4	0	---
Below average (1,300 - 1,599 lbs. per acre)	27	25.0	11	10.2	13	12.0	3	2.8
Above average (1,600 - 1,899 lbs. per acre)	27	25.0	16	14.8	8	7.4	3	2.8
Considerably above average (1,900 or more lbs. per acre)	27	25.0	13	12.0	12	11.1	2	1.9
Total Study	108	100.0	59	54.6	41	37.9	8	7.5

TABLE IV

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO TENURE STATUSES OF 108 SELECTED FARMERS IN TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	All Farmers Included		Tobacco Grown By						Sharecropper	
	No.	Per Cent	Owner		Tenant		No.	Per Cent	No.	Per Cent
			No.	Per Cent	No.	Per Cent				
Considerably below average (below 1,300 lbs. per acre)	27	25.0	12	11.1	0	---	15	13.9		
Below average (1,300-1,599 lbs. per acre)	27	25.0	10	9.2	0	---	17	15.8		
Above average (1,600-1,899 lbs. per acre)	27	25.0	12	11.1	0	---	15	13.9		
Considerably above average (1,900 or more lbs. per acre)	27	25.0	15	13.9	0	---	12	11.1		
Total Study	108	100.0	49	45.3	0	---	59	54.6		

TABLE V

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO AGES OF 108 SELECTED FARMERS IN
TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	Farmers By Age Group							
	All Farmers Included		Young Below 40		Medium 40 to 60		Old Over 60	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	6	5.6	15	13.9	6	5.5
Below average (1,300-1,599 lbs. per acre)	27	25.0	1	0.9	17	15.7	9	8.4
Above average (1,600-1,899 lbs. per acre)	27	25.0	4	3.7	12	11.1	11	10.2
Considerably above average (1,900 or more lbs. per acre)	27	25.0	3	2.8	17	15.7	7	6.5
Total Study	108	100.0	14	13.0	61	56.4	33	30.6

TABLE VI

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO EDUCATIONAL LEVELS ATTAINED BY
108 SELECTED FARM OWNERS IN TROUSDALE COUNTY, TENNESSEE,
1957 THROUGH 1961

Yield Group	All Farmers Included		Number of Years of School Completed					
			0 - 8		9 - 12		13 or more	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	17	15.7	8	7.4	2	1.9
Below average (1,300-1,599 lbs. per acre)	27	25.0	19	17.6	7	6.5	1	0.9
Above average (1,600-1,899 lbs. per acre)	27	25.0	20	18.5	5	4.6	2	1.9
Considerably above average (1,900 or more lbs. per acre)	27	25.0	17	15.7	9	8.4	1	0.9
Total Study	108	100.0	73	67.5	29	26.9	6	5.6

Twenty-nine (26.9 per cent) had had training beyond the 12th grade. One-half of the farmers in the below average group had 8 grades or less of formal education. The trend in relation between yields and educational levels appeared to be inconsequential.

Major sources of income. Eighty-three (76.9 per cent) of the 108 farmers interviewed depended upon tobacco as their major source of income. Reference to Table VII shows a possible slight positive relationship between yield and the reporting of tobacco as the major source of income. Five of the remainder were dairy farmers, 4 received their major income from the sale of livestock, and 16 depended on off-farm employment as their major source of income. There seemed to be no clear relationship between major source of income and yield level among the full-time farmers; while of the 16 part-time farmers, 10 (about 63 per cent) were below the county average (5 in the below average yield group and 5 in the considerably below average group).

Individual Production Practices

Blackshank. Trousdale County is one of the counties in the State most heavily infested with blackshank. A survey made in 1956 showed that more than 300 farms (approximately 45 per cent of the total farms at that time) had a history of blackshank. However, the present study indicated that blackshank disease was less of a problem. Seventy (64.9 per cent) of the 108 farmers indicated no evidence of blackshank in the 1961 or 1962 crop (see Table VIII).

TABLE VII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO MAJOR SOURCES OF INCOME OF 108
SELECTED FARMERS IN TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	All Farmers Included		Major Source of Income					
			Tobacco		Dairying		Livestock	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	18	16.6	2	1.9	2	1.9
							5	4.6
Below average (1,300 - 1,599 lbs. per acre)	27	25.0	20	18.6	1	0.9	1	0.9
							5	4.6
Above average (1,600 - 1,899 lbs. per acre)	27	25.0	22	20.4	1	0.9	1	0.9
							3	2.8
Considerably above average (1,900 or more lbs. per acre)	27	25.0	23	21.3	1	0.9	0	---
							3	2.8
Total Study	108	100.0	83	76.9	5	4.6	4	3.7
							16	14.8

TABLE VIII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO NUMBERS OF
FARMERS EXPERIENCING BLACKSHANK DISEASE AS REPORTED
BY 108 SELECTED FARMERS IN TROUSDALE COUNTY,
TENNESSEE, 1957 THROUGH 1961

Yield Group	All Farmers Included		Number of Farmers Experiencing Blackshank Disease			
			Yes		No	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	12	11.1	15	13.9
Below average (1,300-1,599 lbs. per acre)	27	25.0	9	8.3	18	16.7
Above average (1,600-1,899 lbs. per acre)	27	25.0	9	8.3	18	16.7
Considerably above average (1,900 or more lbs. per acre)	27	25.0	8	7.4	19	17.6
Total Study	108	100.0	38	35.1	70	64.9

Thirty-eight (35.1 per cent) reported having had from a few to many plants diseased. The disease does not seem to be drastically affecting the yield levels of farmers in the county now, though a slight yield advantage may appear to exist in favor of those reporting no blackshank.

Use of manure. As seen in Table IX, there seemed to be a definite positive relationship between the tons of manure used and the yield level. Of the 108 growers interviewed, 19 (17.6 per cent) used no manure, 35 (32.3 per cent) used from 1 to 10 tons per acre, 41 (38.0 per cent) used from 11 to 15 tons per acre and 13 (12.1 per cent) used 16 or more tons per acre. Twenty-five (about 93 per cent) of the 27 farmers in the considerably above average group reportedly used from 1 to 16 tons of manure per acre. This indicates that the abundant use of manure seems to be an important consideration for tobacco growers desiring to produce high yields.

Soil test usage. Data in Table X show that 32 (approximately 30 per cent) of the farmers interviewed in this study reportedly were following soil test recommendations. A slightly larger percentage of the farmers in the above average groups were following soil test recommendations than was true of farmers in below average group.

Fertilizer usage. Data in Table XI show evidence in favor of relatively heavy applications of commercial fertilizer. Seventy-eight (73 per cent) of the 108 growers interviewed used 1,000 or

TABLE IX

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO TONS OF MANURE APPLIED TO TOBACCO AND
AVERAGE TOTAL TONS APPLIED PER ACRE BY 108 SELECTED FARMERS IN TROUSDALE
COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	All Farmers Included		Farmers by Tons Applied Group						Per Year		Average Total	
	No.	Cent	None		1 - 10		11 - 15		16 or more		Tons Manure Applied	Per Acre
			No.	Cent	No.	Cent	No.	Cent	No.	Cent		
Considerably below average (below 1,300 lbs. per acre)	27	25.0	10	9.3	9	8.3	5	4.6	3	2.8		10.0
	27	25.0	4	3.7	12	11.1	9	8.3	2	1.9		9.4
	27	25.0	3	2.8	10	9.2	10	9.3	4	3.7		10.8
Considerably above average (1,900 or more lbs. per acre)	27	25.0	2	1.8	4	3.7	17	15.8	4	3.7		12.8
	108	100.0	19	17.6	35	32.3	41	38.0	13	12.1		9.0
	Total Study											

TABLE X

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO NUMBERS
OF GROWERS WHO FERTILIZED TOBACCO ACCORDING TO
SOIL TEST RECOMMENDATIONS AS REPORTED BY 108
SELECTED FARMERS IN TROUSDALE COUNTY,
TENNESSEE, 1957 THROUGH 1961

Yield Group	All Farmers Included		Farmers Following Soil Test Recommendations			
			Yes		No	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	7	6.5	20	18.5
Below average (1,300-1,599 lbs. per acre)	27	25.0	8	7.4	19	17.6
Above average (1,600-1,899 lbs. per acre)	27	25.0	7	6.5	20	18.5
Considerably above average (1,900 or more lbs. per acre)	27	25.0	10	9.3	17	15.7
Total Study	108	100.0	32	29.7	76	70.3

RELATIONSHIP OF PESTICIDES APPLIED TO TOBACCO BY
CULTIVATOR 1961

Yield Group	Average Pounds Per Acre Per Year ^a				
	All In- r No	1,000 - 1,500		1,501 or more	
		No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	2.7	8	7.4	5	4.6
Below average (1,300 - 1,599 lbs. per acre)	2.8	11	10.2	10	9.2
Above average (1,600 - 1,899 lbs. per acre)	2.9	13	12.0	10	9.3
Considerably above average (1,900 or more lbs. per acre)	2.7	8	7.4	13	12.0
Total Study	10.1	40	37.0	38	35.1

^aAll analyses

more pounds of commercial fertilizer per acre (all analyses included). An increasingly greater proportion of the higher producers reported having used larger amounts of commercial fertilizer.

Fertilizer placement. Nearly all (97.1 per cent) of the farmers interviewed reportedly used the broadcast method of fertilizer placement. Two (1.9 per cent) used no fertilizer, 4 (3.7 per cent) applied in row, and 3 (2.7 per cent) used both row and broadcast methods, as shown in Table XII.

Commercial fertilizer application to plant bed. As seen in Table XIII, nearly 93 per cent of the farmers interviewed used between 50 and 100 pounds of plant bed fertilizer per 100 square yards of bed. Almost 77 per cent used 50 pounds per 100 square yards, as recommended by tobacco experiment station research work in Tennessee. About 16 per cent used as much as 100 pounds per 100 square yards, 1 per cent used 75 pounds per 100 square yards, and only about 5 per cent reported using no fertilizer in the plant bed. Four of the 5 reporting no fertilizer used on plant beds were in the considerably below average yield group, the fifth one being in the considerably above average group. Of the 83 farmers (76.9 per cent) using the recommended 50 pounds per 100 square yards, more than one-half were in the above average groupings. More of those in the below average groups were at the "over-fertilization" level of 100 pounds of fertilizer per 100 square yards of plant bed.

TABLE XII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO METHODS OF FERTILIZER PLACEMENT
USED BY 108 SELECTED FARMERS IN TROUSDALE COUNTY, TENNESSEE,
1957 THROUGH 1961

Yield Group	All Farmers Included	Farmers by Method of Fertilizer Placement							
		None		Broadcast		In Row		Both	
	No.	Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No. Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	2	1.9	25	23.1	0	---	0 ---
Below average (1,300 - 1,599 lbs. per acre)	27	25.0	0	---	26	24.0	3	2.8	2 1.8
Above average (1,600 - 1,899 lbs. per acre)	27	25.0	0	---	27	25.0	1	0.9	1 0.9
Considerably above average (1,900 or more lbs. per acre)	27	25.0	0	---	27	25.0	0	---	0 ---
Total Study ^a	108	100.0	2	1.9	105	97.1	4	3.7	3 2.7

^aPercentages total more than 100 since some reportedly used more than one method of placement.

TABLE XIII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO COMMERCIAL FERTILIZER TREATMENT OF TOBACCO PLANT BED
AS REPORTED BY 108 SELECTED FARMERS IN TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	Pounds of Commercial Fertilizer Applied Per 100 Square Yards of Plant Bed																							
	All Farmers Included		None				25		50		75		100											
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent		
Considerably below average (below 1,300 lbs. per acre)	27	25.0	4	3.7	0	---	19	17.6	1	0.9	3	2.8												
Below average (1,300 - 1,599 lbs. per acre)	27	25.0	0	---	1	0.9	17	15.7	0	---	9	8.4												
Above average (1,600 - 1,899 lbs. per acre)	27	25.0	0	---	1	0.9	22	20.4	0	---	4	3.7												
Considerably above average (1,900 or more lbs. per acre)	27	25.0	1	0.9	0	---	25	23.2	0	---	1	0.9												
Total Study	108	100.0	5	4.6	2	1.8	83	76.9	1	0.9	17	15.8												

Methods and Time of Plant Bed Sterilization

No definite relationships are to be noted between method of sterilization and yields, or between time of sterilization and yield as shown in Table XIV. It may be noted that 47.3 per cent of the farmers interviewed used cyanamid, 26.8 per cent used methyl bromide gas, 11.1 per cent burned their beds, and 14.8 per cent used two methods. About two-thirds of those interviewed reported fall application of a weed sterilant and nearly one-half reported spring application. A few farmers used cyanamid in the fall on one or more beds, then methyl bromide gas on other beds in the spring. A very few reported using cyanamid in the fall, and then gassing the same bed the following spring. It was interesting to note that a total of only 4 farmers in the two above average yield groups reported burning plant beds, while eight in the below average group reported burning.

Burley Varieties

More than 91 per cent of the 108 farmers interviewed reported using a blackshank resistant variety of tobacco (see Table XV). Approximately 84 per cent used Burley 37 and 7.3 per cent used Burley 11A or 11B varieties. About 5 per cent reported using two or more varieties. No clear relationship could be established between variety and yield in the study as the number of farmers using blackshank resistant varieties were very nearly equally divided.

RELATIONSHIP OF FERTILIZATION REPORTED BY 108
IN 1961

Yield Group	Above In Not	Time of Sterilization			
		Fall		Spring	
		No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27.6	17	15.7	14	13.0
Below average (1,300 - 1,599 lbs. per acre)	27.6	19	17.6	12	11.1
Above average 1,600 - 1,899 lbs. per acre)	27.8	18	16.6	11	10.2
Considerably above average (1,900 or more lbs. per acre)	27.8	17	15.7	12	11.1
Total Study	108.8	71	65.6 ^a	49	45.4

^aPercentages toll sterilization.

TABLE XV

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO TOBACCO VARIETIES USED BY 108 SELECTED FARMERS IN TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	All Farmers Included		Ky. 9		11A or 11B ^a		Burley 21		Ky. 37 ^a		Other ^b	
	No.	Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	0	---	1	0.9	1	0.9	25	23.1	0	---
Below average (1,300 - 1,599 lbs. per acre)	27	25.0	2	1.8	2	1.8	2	1.8	23	21.3	1	0.9
Above average (1,600 - 1,899 lbs. per acre)	27	25.0	2	1.8	3	2.8	0	---	22	20.4	1	0.9
Considerably above average (1,900 or more lbs. per acre)	27	25.0	2	1.8	2	1.8	4	3.7	21	19.4	1	0.9
Total Study	108	105.0 ^c	6	5.4	8	7.3	7	6.4	88	84.2	3	2.7

^aBlackshank resistant varieties.

^bOther varieties included Ky. 35, Hybrid "Rickard" Experimental, Ky. private seed producer, Highleaf.

^cPercentages total more than 100 since some reportedly used more than one variety of tobacco.

Plant Bed Seeding Rate

Reference to Table XVI shows that 96 (88.8 per cent) of the 108 farmers in the study followed research recommendations of seeding 2 to 3 level teaspoons of seed per 9 x 100 feet plant bed. It is to be noted that a higher percentage of the considerably above average yield group used only two teaspoons of seed than was true of the others. Also, none of the former growers were found among those using 4 or 5 teaspoons.

Plant Bed Weed Infestation

As seen in Table XVII, thirty-seven (34.3 per cent) of the 108 farmers interviewed reported no weeds in their tobacco beds, 63 (58.2 per cent) reported some weeds and 8 (7.5 per cent) reported heavy weed infestation. The study shows some indication that the highest yield group did the best job of controlling weeds; though the relation between adequate weed control and yield is not clear.

Quality of Tobacco Plants

Reference to Table XVIII shows that 36 (33.4 per cent) of the farmers interviewed stated that they had tobacco plants of excellent quality and 50 (46.2 per cent) said that their plants were of good quality, for a total of 86 (79.6 per cent) indicated they had quality plants to take to the field at setting time. Nineteen (17.6 per cent) said that their plants were of fair quality, and 3 (2.8 per cent) reported having plants of poor quality. More growers with considerably above average yields had

TABLE XVI

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO PLANT BED SEEDING RATE USED BY 108
SELECTED FARMERS IN TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	Level Teaspoons Seed Used Per 9 x 100 Feet Bed									
	All Farmers Included		2		3		4		5	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	5	4.6	17	15.8	4	3.7	1	0.9
Below average (1,300 - 1,599 lbs. per acre)	27	25.0	6	5.5	17	15.7	2	1.9	2	1.9
Above average (1,600 - 1,899 lbs. per acre)	27	25.0	6	5.6	18	16.6	3	2.8	0	---
Considerably above average (1,900 or more lbs. per acre)	27	25.0	12	11.1	15	13.9	0	---	0	---
Total Study	108	100.0	29	26.8	67	62.0	9	8.4	3	2.8

TABLE XVII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO DEGREE OF PLANT BED WEED INFESTATION
OF 108 SELECTED FARMERS IN TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	All Farmers Included		Degree of Weed Infestation in Plant Bed					
			None		Some		Much	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	9	8.3	16	14.8	2	1.9
Below average (1,300-1,599 lbs. per acre)	27	25.0	6	5.6	20	18.5	1	1.9
Above average (1,600-1,899 lbs. per acre)	27	25.0	7	6.5	17	15.7	3	2.8
Considerably above average (1,900 or more lbs. per acre)	27	25.0	15	13.9	10	9.2	2	1.9
Total Study	108	100.0	37	34.3	63	58.2	8	7.5

TABLE XVIII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO QUALITY OF TOBACCO PLANTS
REPORTED BY 108 SELECTED FARMERS IN TROUSDALE COUNTY, TENNESSEE,
1957 THROUGH 1961

Yield Group	All Farmers Included		Farmers by Plant Quality Group							
			Excellent		Good		Fair		Poor	
	No.	Per. Cent	No.	Per. Cent	No.	Per. Cent	No.	Per. Cent	No.	Per. Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	6	5.6	16	14.8	5	4.6	0	---
Below average (1,300 - 1,599 lbs. per acre)	27	25.0	9	8.4	13	12.0	5	4.6	0	---
Above average (1,600 - 1,899 lbs. per acre)	27	25.0	9	8.3	13	12.0	3	2.8	2	1.9
Considerably above average (1,900 or more lbs. per acre)	27	25.0	12	11.1	8	7.4	6	5.6	1	0.9
Total Study	108	100.0	36	33.4	50	46.2	19	17.6	3	2.8

excellent plants and fair and poor plants. One possible explanation for this fact might be the possibility that they recognized plant quality more than did the others. Definite relations between plant quality and yield were not clear.

Insecticides Applied to Plant Beds

Reference to Table XIX shows that 86 (79.6 per cent) of the 108 farmers interviewed in this study applied insecticides to their plants. Twenty-two (20.4 per cent) reported that they applied no insecticides directly to the plants in the bed, however, a great number of this group did indicate (in conversation) that they applied "poisoned fertilizer" which was fertilizer impregnated with an insecticide. No definite conclusions could be drawn from this comparison of yield level and plant bed insecticide application, but a higher percentage of those in the considerably above average yield group did apply insecticides than was true of those in the considerably below average yield group.

Effectiveness of Insect Control

Farmers in the above average and considerably above average yield groups did report more effectiveness from insecticides than those in the below and considerably below average groups as may be seen in Table XX.

Time and Method of Transplanting

Data presented in Table XXI show that the low yield producers transplanted at medium to late dates in the season; while

TABLE XIX

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO USE OF INSECTICIDES
ON PLANT BEDS AS REPORTED BY 108 SELECTED FARMERS IN
TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Crop	All Farmers Included		Insecticides Applied To Plant Beds			
			Yes		No	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	20	18.5	7	6.5
Below average (1,300-1,599 lbs. per acre)	27	25.0	22	20.4	5	4.6
Above average (1,600-1,899 lbs. per acre)	27	25.0	20	18.5	7	6.5
Considerably above average (1,900 or more lbs. per acre)	27	25.0	24	22.2	3	2.8
Total Study	108	100.0	86	79.6	22	20.4

TABLE XX

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO EFFECTIVENESS OF INSECT CONTROL IN
TOBACCO PLANT BEDS OF 108 SELECTED FARMERS IN TROUSDALE COUNTY, TENNESSEE,
1957 THROUGH 1961

Yield Group	Effectiveness of Insect Control in Plant Beds							
	All Farmers Included		Good		Fair		Poor	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	20	18.5	7	6.5	0	---
Below average (1,300-1,599 lbs. per acre)	27	25.0	23	21.3	4	3.7	0	---
Above average (1,600-1,899 lbs. per acre)	27	25.0	27	25.0	0	---	0	---
Considerably above average (1,900 or more lbs. per acre)	27	25.0	27	25.0	0	---	0	---
Total Study	108	100.0	97	89.8	11	10.2	0	---

TABLE XXI

RELATIONSHIP OF TOBACCO YIELD PRODUCED TO TIME AND METHOD OF TOBACCO TRANSPLANTED REPORTED
BY 108 SELECTED FARMERS IN TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	All Farmers Included		Farmers by Transplanting Time Group ^a								Farmers by Method Group ^b			
			Early		Medium		Late		Hand		Machine			
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent		
	No.	Cent	No.	Cent	No.	Cent	No.	Cent	No.	Cent	No.	Cent		
Considerably below average (below 1,300 lbs. per acre)	27	25.0	6	5.5	18	16.6	3	2.8	12	11.1	20	18.5		
Below average (1,300 - 1,599 lbs. per acre)	27	25.0	11	10.2	14	13.0	2	1.8	8	7.4	22	20.4		
Above average (1,600 -1,899 lbs. per acre)	27	25.0	16	14.9	9	8.3	2	1.8	9	8.3	18	16.7		
Considerably above average (1,900 or more lbs. per acre)	27	25.0	21	19.5	5	4.6	1	0.9	2	1.8	25	23.1		
Total Study	108	100.0	54	50.2	46	42.5	8	7.3	31	28.6	85	78.7		

^aEarly--before May 20; Medium--May 20-31; Late--June 1 or later.

^bPercentages total more than 100 since reportedly some used more than one method of transplanting.

most of the high producers were transplanting before May 20.

Eighty-five (73.7 per cent) of the producers transplanted by machine rather than by hand, however, data do not show any clear evidence of yield differences. Most farmers did express the opinion that tobacco grows off faster and is easier cultivated after machine setting, and more of those in the considerably above average yield group reported machine setting than was true of any other group.

Rotation Practices

Seventy-seven (71.3 per cent) of the tobacco farmers interviewed reported that they grew tobacco continuously on the same land year after year, as shown in Table XXII. Rotation with tobacco growing one in two years and one in three years apparently had no greater relation to yield level than did continuous culture, however, numbers reporting rotations were relatively small.

Cover Crops Grown Preceding Tobacco

The data comparing kinds of cover crops grown preceding tobacco are shown in Table XXIII. Eight (7.5 per cent) of the farmers reported no cover crops used, 35 (32.5 per cent) reported rye alone, 12 (11.1 per cent) reported oats alone, 21 (19.5 per cent) used rye and crimson clover, 3 (2.7 per cent) used oats and crimson clover, 7 (6.4 per cent) used crimson clover alone, 6 (5.5 per cent) used a combination of rye and vetch, 16 (14.8 per

TABLE XXII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO TOBACCO CROP ROTATION PRACTICE
 FOLLOWED BY 108 SELECTED FARMERS IN TROUSDALE COUNTY, TENNESSEE,
 1957 THROUGH 1961

Yield Group	Farmers by Rotation Practice Followed					
	All Farmers Included		Continuous Tobacco		Tobacco One Year in Two	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	18	16.7	3	2.8
Below average (1,300-1,599 lbs. per acre)	27	25.0	21	19.4	3	2.8
Above average (1,600-1,899 lbs. per acre)	27	25.0	20	18.5	2	1.9
Considerably above average (1,900 or more lbs. per acre)	27	25.0	18	16.7	4	3.7
Total Study	108	100.0	77	71.3	12	11.2
					19	17.5

TABLE XXIII
RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO KIND OF COVER CROP USED BY 108 SELECTED FARMERS IN TROUSDALE
COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	All Farmers Included		None		Rye		Oats		Rye & Crimson Clover		Oats & Crimson Clover		Crimson Clover		Rye and Vetch		Barley & Crimson Clover	
	No.	Cent	No.	Cent	No.	Cent	No.	Cent	No.	Cent	No.	Cent	No.	Cent	No.	Cent	No.	Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	4	3.7	6	5.6	2	1.9	6	5.6	0	---	3	2.8	1	0.9	5	4.6
Below average (1,300 - 1,599 lbs. per acre)	27	25.0	2	1.9	7	6.5	4	3.7	7	6.5	0	---	2	1.8	1	0.9	4	3.7
Above average (1,600 - 1,899 lbs. per acre)	27	25.0	0	---	13	12.0	3	2.8	6	5.6	1	0.9	1	0.9	1	0.9	2	1.9
Considerably above average (1,900 or more lbs. per acre)	27	25.0	2	1.9	9	8.4	3	2.8	2	1.8	2	1.8	1	0.9	3	2.8	5	4.6
Total Study	108	100.0	8	7.5	35	32.5	12	11.1	21	19.5	3	2.7	7	6.4	6	5.5	16	14.8

cent) used barley and crimson clover combined.

Study of the data seems to show an advantage for the use of the following cover crops in order: 1) rye and vetch, 2) rye, and 3) oats and crimson clover. Most farmers reported a good stand and growth of rye, but that it could be a problem to turn under and sometimes hard to decompose.

Turning of Cover Crops

Reference to Table XXIV indicates the high percentage of farmers turning cover crops, 92.5 per cent of the 108 interviewed.

Depth of Cultivation

As seen in Table XXV, 71 (65.8 per cent) of the 108 farmers interviewed reported shallow cultivation of tobacco, 37 (34.2 per cent) reported deep cultivation. However, depth of cultivation did not appear to be related to yield variation in Trousdale County.

Width Between Tobacco Rows

Data in Table XXVI indicate an apparently greater preference among growers in above average yield groups for wider plantings between rows; though the relationship is not a large one.

Spacing of Tobacco Plants Within Rows

Table XXVII discloses that those in the considerably above average yield group were all in the 16-18 inch planting category; while others included individuals spacing plants in 12-15 and

TABLE XXIV

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO FARMERS TURNING
COVER CROP AS REPORTED BY 108 SELECTED FARMERS OF
TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Crop	All Farmers Included		Number of Farmers Turning Cover Crop			
			Yes		No	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	23	21.3	4	3.7
Below average (1,300-1,599 lbs. per acre)	27	25.0	25	23.1	2	1.9
Above average (1,600-1,899 lbs. per acre)	27	25.0	27	25.0	0	---
Considerably above average (1,900 or more lbs. per acre)	27	25.0	25	23.1	2	1.9
Total Study	108	100.0	100	92.5	8	7.5

TABLE XXV

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO DEPTH OF
CULTIVATION REPORTED BY 108 SELECTED FARMERS IN
TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	All Farmers Included		Farmers by Depth of Cultivation Group			
	No.	Per Cent	Deep	Per Cent	Shallow	Per Cent
			No.		No.	
Considerably below average (below 1,300 lbs. per acre)	27	25.0	7	6.5	20	18.5
Below average (1,300-1,599 lbs. per acre)	27	25.0	10	9.2	17	15.8
Above average (1,600-1,899 lbs. per acre)	27	25.0	12	11.1	15	13.9
Considerably above average (1,900 or more lbs. per acre)	27	25.0	8	7.4	19	17.6
Total Study	108	100.0	37	34.2	71	65.8

TABLE XXVI

RELATIONSHIP OF TOBACCO YIELDS PRODUCED AS TO WIDTH BETWEEN ROWS AS REPORTED BY
108 SELECTED FARMERS OF TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	Number of Farmers as to Width Between Rows in Inches					
	All Farmers Included		Less than 36		36 - 38	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	3	2.8	19	17.6
Below average (1,300-1,599 lbs. per acre)	27	25.0	6	5.5	14	13.0
Above average (1,600-1,899 lbs. per acre)	27	25.0	3	2.8	16	14.8
Considerably above average (1,900 or more lbs. per acre)	27	25.0	0	---	19	17.6
Total Study	108	100.0	12	11.1	68	63.0
					28	25.9

TABLE XXVII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED AS TO SPACING WITHIN ROWS AS REPORTED
BY 108 SELECTED FARMERS OF TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	All Farmers Included		Numbers of farmers as to Spacing Within Rows in Inches					
			12 - 15		16 - 18		19 - 20	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	1	0.9	25	23.2	1	0.9
Below average (1,300-1,599 lbs. per acre)	27	25.0	2	1.9	24	22.2	1	0.9
Above average (1,600-1,899 lbs. per acre)	27	25.0	3	2.8	22	20.3	2	1.9
Considerably above average (1,900 or more lbs. per acre)	27	25.0	0	---	27	25.0	0	---
Total Study	108	100.0	6	5.6	98	90.7	4	3.7

19-20 inch categories. The relationship between yield and spacing, however, is not a clear one.

Plant Population Per Acre

It appears that there might be a slight negative relationship between plant population and yield per acre, as shown in Table XXVIII. The per acre average number of plants in the considerably below average yield groups was 10,291 as compared to 9,249 in the considerably above average yield group, although median number of plants per acre for the same groups were identical (9,680).

Uniformity of Stand

As seen in Table XXIX, there appears to be a positive relation between yield and uniformity of tobacco plant stand.

Time Between Topping and Harvest

The length of time between topping and harvest appears to be somewhat associated with yield as presented in Table XXX. Only 1 (0.9 per cent) of the farmers interviewed said that he harvested immediately after topping, 4 (3.8 per cent) harvested one week after topping, 28 (25.9 per cent) harvested two weeks after topping and 74 (79.4 per cent) of the farmers interviewed in the study let their tobacco stand three weeks or more between topping and harvesting.

TABLE XXVIII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO TOBACCO PLANT POPULATION OF 108 SELECTED FARMERS IN TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

	Number of Farmers Included	Average Number of Tobacco Plants Per Acre	Median Number of Plants Per Acre	Range in Numbers of Plants Per Acre
Considerably below average (below 1,300 lbs. per acre)	27	10,291	9,680	8,297 - 12,446
Below average (1,300 - 1,599 lbs. per acre)	27	9,540	9,680	7,968 - 13,068
Above average (1,600 - 1,899 lbs. per acre)	27	8,932	9,335	8,297 - 14,011
Considerably above average (1,900 or more lbs. per acre)	27	9,249	9,680	8,297 - 11,531
Total Study	108	9,503	9,680	7,468 - 14,011

NOTE: University of Tennessee Agronomy Department plant count chart used
(see Appendix B).

TABLE XXIX

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO UNIFORMITY OF TOBACCO PLANT STANDS
REPORTED BY 108 SELECTED FARMERS IN TROUSDALE COUNTY, TENNESSEE,
1957 THROUGH 1961

Yield Group	All Farmers Included		Farmers by Degree of Uniformity of Tobacco Stand Group ^a					
	No.	Per Cent	Good		Medium		Poor	
			No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	18	16.7	9	8.3	0	---
Below average (1,300-1,599 lbs. per acre)	27	25.0	21	19.5	5	4.6	1	0.9
Above average 1,600-1,899 lbs. per acre)	27	25.0	21	19.5	6	5.5	0	---
Considerably above average (1,900 or more lbs. per acre)	27	25.0	26	24.1	1	0.9	0	---
Total Study	108	100.0	86	79.8	21	19.3	1	0.9

^aGood Stand--90 per cent or more plant livability; Medium Stand--80 to 90 per cent plant livability, and Poor Stand--below 80 per cent plant livability.

TABLE XXX

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO WEEKS OF GROWTH OF TOBACCO BETWEEN TOPPING AND HARVEST AS REPORTED BY 108 SELECTED FARMERS IN TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	Farmers by Group According to Weeks of Tobacco Growth Between Topping and Harvest											
	All Farmers Included		Less Than One Week		One Week		Two Weeks		Three Weeks		Over Three Weeks	
	No.	Cent	No.	Cent	No.	Cent	No.	Cent	No.	Cent	No.	Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	1	0.9	2	1.9	5	4.6	14	13.0	5	4.6
Below average (1,300 - 1,599 lbs. per acre)	27	25.0	0	---	2	1.9	9	8.3	16	14.8	0	---
Above average (1,600 - 1,899 lbs. per acre)	27	25.0	0	---	0	---	7	6.5	13	12.0	7	6.5
Considerably above average (1,900 or more lbs. per acre)	27	25.0	0	---	0	---	7	6.5	16	14.8	4	3.7
Total Study	108	100.0	1	0.9	4	3.8	28	25.9	59	54.6	16	14.8

Stage of Maturity and Height of Tobacco When Topped

As shown in Table XXXI, farmers in the considerably above average group tended to top tobacco at the early stage (before 40 per cent of the plants bloom); while those in other groups tended to top at the medium stage (during the time when 40 to 75 per cent of the plants are in bloom). Seventy-one (65.7 per cent) reported topping tobacco at a medium height (when 22 to 26 leaves are left).

Sucker Control

There seemed to be no significant difference in yield as compared to degree of sucker control. Reference to Table XXXII shows that 95 (87.9 per cent) of the 108 farmers interviewed reported complete sucker control, 10 (9.3 per cent) reported some control, 3 (2.8 per cent) reported poor control.

As seen in Table XXXIII, 82 (75.9 per cent) reported that suckers were pulled by hand and 24 (21.2 per cent) used a chemical growth inhibitor to control suckers. More of the considerably above average yield group used chemical sucker control than did the others. Maleic Hydrazide (MH30) was the only sucker growth inhibitor reportedly used.

Disease and Insect Damage

Table XXXIV shows that 73 (67.7 per cent) of the 108 farmers interviewed reported no evidence of disease damage, 22 (20.4 per cent) reported some disease and 13 (12.0 per cent) reported much disease damage. More of those in the above average

TABLE XXXII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO DEGREE OF TOBACCO SUCKER CONTROL AS
REPORTED BY 108 SELECTED FARMERS IN TROUSDALE COUNTY, TENNESSEE,
1957 THROUGH 1961

Yield Group	All Farmers Included		Farmers by Degree of Sucker Control Group ^a					
			Complete		Some		Poor	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	23	21.3	3	2.8	1	0.9
Below average (1,300-1,599 lbs. per acre)	27	25.0	24	22.2	2	1.9	1	0.9
Above average (1,600-1,899 lbs. per acre)	27	25.0	24	22.2	2	1.8	1	1.0
Considerably below average (1,900 or more lbs. per acre)	27	25.0	24	22.2	3	2.8	0	---
Total Study	108	100.0	95	87.9	10	9.3	3	2.8

^aComplete--no suckers allowed to grow; Some--tobacco suckered one time, or late,
or two top suckers left; Poor--no suckers removed or suckered very late.

TABLE XXXIII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO METHOD OF SUCKER CONTROL REPORTED BY
108 SELECTED FARMERS IN TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	Farmers as to Method of Sucker Control					
	All Farmers Included		Hand		Chemical	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	25	23.1	2	1.9
Below average (1,300-1,599 lbs. per acre)	27	25.0	20	18.5	7	6.5
Above average (1,600-1,899 lbs. per acre)	27	25.0	22	20.4	5	4.5
Considerably above average (1,900 or more lbs. per acre)	27	25.0	15	13.9	9	8.3
Total Study	108	100.8 ^a	82	75.9	24	21.2
					4	3.7

^aPercentages total more than 100 since reportedly some farmers used more than one method of sucker control.

RELATIONSHIP OF YIELD TO TOBACCO AS REPORTED BY
FARMERS THROUGH 1961

Yield Group	Farmers by Tobacco Insect- Damage Group				
	Per cent	Some		None	
		No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	2.9	10	9.3	15	13.9
Below average (1,300 - 1,599 lbs. per acre)	20.9	16	14.9	10	9.2
Above average (1,600 - 1,899 lbs. per acre)	20.9	17	15.7	9	8.4
Considerably above average (1,900 or more lbs. per acre)	20.9	13	12.0	13	12.0
Total Study	104.6	56	51.9	47	43.5

groups reported some or much disease damage than did those in below average groups.

Fifty-six (51.9 per cent) reported some evidence of insect damage, 5 (4.6 per cent) reported much and 47 (43.5 per cent) reported no insect damage. The majority of those interviewed seemed to be doing a good job of controlling all insects excepting flea beetles late in the season. This was the one insect that seemed the most difficult to control. No relationship was noted between yield group and insect damage.

Priming

Table XXXV indicates that 15 (13.9 per cent) of the 108 farmers interviewed reported priming tobacco one time. None primed more than once. Approximately as many low yield producers primed as did high yield producers, so there seemed to be no relation between priming and yield level.

Stage of Maturity at Harvest

A slightly larger percentage of those in above average groups reported harvesting tobacco at a ripe stage than was true with the others, as seen in Table XXXVI.

Number of Grades

Table XXXVII shows that 89 (82.5 per cent) of farmers interviewed reported making three grades of tobacco--"all flyings," "leaf" and "red," respectively, were tied in one grade. Five (4.6 per cent) reported making two grades and 14 (12.9 per cent) made

TABLE XXXV

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO NUMBER OF FARMERS
PRIMING BOTTOM LEAVES AS REPORTED BY 108 SELECTED
FARMERS IN TROUSDALE COUNTY, TENNESSEE,
1957 THROUGH 1961

Yield Group	All Farmers Included		Farmers Priming Tobacco			
			Yes		No	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	3	2.8	24	22.2
Below average (1,300-1,599 lbs. per acre)	27	25.0	5	4.6	22	20.4
Above average (1,600-1,899 lbs. per acre)	27	25.0	3	2.8	24	22.2
Considerably above average (1,900 or more lbs. per acre)	27	25.0	4	3.7	23	21.3
Total Study	108	100.0	15	13.9	93	86.1

TABLE XXXVI

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO STAGE OF MATURITY AT
HARVEST AS REPORTED BY 108 SELECTED FARMERS IN TROUSDALE
COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Group	All Farmers Included		Farmers Reporting Stage of Maturity at Harvest			
	No.	Per Cent	Ripe		Green	
			No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	17	15.7	10	9.3
Below average (1,300-1,599 lbs. per acre)	27	25.0	17	15.8	10	9.2
Above average (1,600-1,899 lbs. per acre)	27	25.0	18	16.7	9	8.3
Considerably above average (1,900 or more lbs. per acre)	27	25.0	20	18.5	7	6.5
Total Study	108	100.0	72	66.7	36	33.3

TABLE XXXVII

RELATIONSHIP OF TOBACCO YIELDS TO NUMBER OF GRADES MADE BY 108 SELECTED FARMERS
OF TROUSDALE COUNTY, TENNESSEE, 1957 THROUGH 1961

Yield Groups	All Farmers Included		Farmers as to Number of Grades					
	No.	Per Cent	Two		Three		Four	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,300 lbs. per acre)	27	25.0	1	0.9	22	20.4	4	3.7
Below average (1,300-1,599 lbs. per acre)	27	25.0	3	2.8	22	20.4	2	1.8
Above average (1,600-1,899 lbs. per acre)	27	25.0	1	0.9	21	19.5	5	4.6
Considerably above average (1,900 or more lbs. per acre)	27	25.0	0	---	24	22.2	3	2.8
Total Study	108	100.0	5	4.6	89	82.5	14	12.9

four grades. The same practices seemed to exist with both low and high yield groups.

IV. INSTRUMENTS FOR MEASUREMENT

The General Principles of Burley Tobacco Production True-False Test

A true-false test was prepared for use with a class of tobacco growers. The test was developed for use both before and after teaching to determine progress made in terms of knowledge of burley tobacco subject matter. The test consisted of fifty true-false questions. The questions were drawn from data found in current University of Tennessee bulletins, publications and mimeographed handouts (see Appendix C).

Recommended Burley Tobacco Production Practice Checklists (Did and Will Do)

Two recommended tobacco production practice checklists "A" and "B" were developed for use in measuring the practice level of tobacco growers at the beginning and at the close of a series of tobacco production classes. Twenty-eight "yes" or "no" questions were asked on checklist "A" pertaining to growers past practices (did) before teaching; while the same questions were asked pertaining to growers' plans for 1964 on checklist "B" (will do) at the close of three teaching sessions (see Appendix G).

V. STATISTICAL PROCEDURES

The procedure for analyzing the data was Student's t-test. Difference between scores received on true-false tests and practice checklists administered before and after teaching were the observations used for analysis. The following formula from Snedecor (10:50) was used:

$$t_{n-1} = \frac{\bar{d} - \mu_d}{S_{\bar{d}}}$$

when $\bar{d}$ = the mean difference between pre-test and post-test scores

μ_d = the mean of the population, here hypothesized to zero

$S_{\bar{d}}$ = the standard deviation of the mean or standard error

According to Snedecor (10:52), two observations on the same individual should always be paired.

The one and five per cent probability levels were selected for testing significance.

CHAPTER IV

PLANS FOR THE INTENSIVE TEACHING APPROACH

I. THE SITUATION

Approximately forty-three per cent of the Trousdale County farm income in the five year period 1957-1961 was from the sale of burley tobacco; yet at the same time the Trousdale County average yield was approximately 275 pounds per acre under the state average. A study of the data from a production practice interview with 108 Trousdale County tobacco growers showed a variation in tobacco yields ranging from a low of approximately 800 pounds per acre produced by one farmer to a high of approximately 2,800 pounds per acre produced by another.

Data from the production practice survey of 108 selected Trousdale County tobacco growers reveal that ninety-three (86 per cent) of the farms surveyed were owned by men, fifteen (13 per cent) owned by women, and five (4.8 per cent) by negro men. Four of the five negro men were in the below average groups. Thirteen of the fifteen women farm owners had below average yields (see Appendix A).

Fourteen per cent of the 108 interviewed were below 40 years of age; 57 per cent were 40 to 60 years of age and 30 per cent were over 60. No trend was shown relating yield levels to any age category.

Seventy-seven per cent of the 108 reported tobacco as their major source of income. Blackshank was not currently affecting yields of those interviewed since 88 of the 108 reported growing Burley 37. Seventy-three per cent used 1,000 or more pounds of commercial fertilizer per acre.

Ninety-three per cent used more than 50 and less than 101 pounds per 9' x 100' of plant bed. Seventy-seven per cent used 50 pounds per 9' x 100' bed. Forty-seven per cent used calcium cyanamid, 27 per cent used methyl bromide gas, 10 per cent burned, and 15 per cent used two methods. Ninety-one per cent reported using blackshank resistant varieties--84 per cent Burley 37, 7 per cent Burley 11A or 11B, and 5 per cent used two or more varieties. Eighty-nine per cent reported using two to three level teaspoons of seed per 9' x 100' plant bed.

Low yield producers transplanted from mid-period to late. High yield producers transplanted by or before May 20. Seventy-seven per cent set by machine. Seventy-one per cent reported that they grew tobacco in continuous culture. Ninety-two per cent reported turning under cover crops. Most higher yielders used rye alone.

Seventy per cent let tobacco stand three weeks or more after topping. Sixty-six per cent reported topping at a "medium" stage (40 to 75 per cent of the plants in bloom). Over 50 per cent of the two above average groups used chemical sucker control, while approximately 25 per cent of the below average group did also.

Fifty-two per cent reported some evidence of insect damage. The flea beetle was reported as the most difficult to control.

Fourteen per cent reported priming tobacco once. Eighty-two per cent reported making three grades of tobacco, five per cent two grades, and 13 per cent four grades.

II. THE MAJOR PROBLEMS

Based on the summary of the study made of the 108 selected Trousdale County tobacco growers, the major problems identified were: 1) the county's average yield per acre was found to be too low (1,461 pounds per acre as compared to the state average of 1,737 pounds per acre), and 2) the county's average income per acre was too low since Trousdale County's median farm income of \$2,189 in 1959 was relatively low when compared with the state median of \$2,222, and the United States median of \$3,228. Therefore the need for an intensive Extension educational effort based on research-verified recommendations to be taught to selected Trousdale County tobacco growers was noted and plans were made accordingly.

III. THE PROGRAM OBJECTIVE

The program objective, then, that was selected was: burley tobacco growers in Trousdale County to increase yields per acre from an average of 1,600 pounds (1957-1961) to an average of 2,000 pounds per acre for the period 1964-1965 by using key recommended practices.

IV. THE TEACHING OBJECTIVES

Teaching objectives included the following: 1) Trousdale County tobacco growers to have favorable attitudes toward adopting research-verified production practices; 2) Trousdale County tobacco growers to know the importance of using fertilizer according to soil test recommendations made by the University of Tennessee State Soil Testing Laboratory; 3) Trousdale County tobacco growers to develop necessary skills in sterilizing plant beds according to latest research-verified practices; 4) Trousdale County tobacco growers to recognize yield and quality derived from proper spacing practices; 5) Trousdale County farmers to understand and to apply research-verified methods of topping and suckering for highest yield, and 6) Trousdale County farmers to develop necessary skills in stripping and sorting tobacco according to group and color.

V. AN INTENSIVE TEACHING APPROACH

One hundred and eight randomly selected Trousdale County tobacco farmers were interviewed and given written invitations to attend a series of three classes where research-verified tobacco production practices would be taught. The classes were taught at weekly intervals from Monday night, February 27 through Monday night, March 16, 1964, with Monday night, March 9, omitted due to a conflicting meeting involving most members of the class.

Farmers were invited by letter, with a return card enclosed, approximately three weeks prior to the first meeting. A card of reminder was mailed to those who did not reply to the first letter; then a reminder of the time and place was sent to those who indicated an interest in the classes (see Appendix E). A letter announcing topic, time and place was mailed to each member of the class for each of the following two sessions. Also, personal contact by phone was made with each class member on the date of class schedule for each of the three classes.

An Intensive Extension Teaching Plan

The step-by-step procedure used and the subject matter content involved are presented below in outline form.

I. First Meeting

A. Purpose of Meeting

- 1) Express appreciation to members of class for help with survey and for being interested enough to attend class.
- 2) Indicate that interest of tobacco growers as expressed at time of interview was basis for deciding to have a series of 3 meetings on tobacco production practices.

- ##### B. Administer a practice checklist as a pre-test and in order to get all members of the class thinking along the same line and as a basis for knowing where to start

in a brief study of tobacco production (see Appendix F). Also administer a general principles True-False Test (50 questions) for the same purpose (see Appendix G). Allow for approximately fifteen minutes for the True-False test and ten minutes for Recommended Tobacco Production Checklist "A".

- C. Present survey findings (see Appendix D). Use a flip-sheet chart to summarize the findings. Make the presentation as palatable as possible by using other prepared visuals. Give a one-page mimeographed survey of the findings to each tobacco grower at the close of the class.
- D. Announce the topics for the next classes and express appreciation for interest.
- E. Adjourn

II. Second Meeting

- A.. Review purpose of class and survey findings briefly (allow five minutes).
- B. Teach tobacco production lesson number 1.
 - 1. Discuss location and preparation of tobacco plant bed.
 - a) Stress importance of selecting a deep loamy soil, high in organic matter and well drained, located in a warm sunny place--preferably a southeastern exposure, close to a convenient water supply.

- b) Note that tobacco bed should be fallowed during summer, fall and winter months to lessen weed seed population.
 - c) Recommend pulverizing soil to 4" to 6" depth.
2. Discuss the current methods of plant bed weed control.
- a) burning
 - b) methyl bromide
 - c) "Vapam," "VPM"
 - d) allyl alcohol
 - e) calcium cyanamid
- Show slides of different methods of sterilization and exhibit material discussed. Use model plant bed to exhibit proper use of methyl bromide gas. Summarize by stating that research workers at the Greeneville U.S.D.A.--U.T. station currently recommend the use of methyl bromide gas (in the fall) as the method most likely to control the most weed seed.
3. Discuss plant bed fertilization
- a) Call attention to the fact that some fertilizer is generally needed with plant production noting that it contributes to the development of large stocky plants, but that excessive use may injure plants.
 - b) State that research work at the U. T.--U.S.D.A. Tobacco Experiment Station at Greeneville has

shown that one-half pound of 4-12-8, or its equivalent, per square yard produced the most satisfactory plants.

- c) Stress broadcasting evenly and mixing with the top two inches of soil just prior to seeding. Suggest that additional nitrogen is not usually needed excepting in cases where heavy rains may cause leaching.
- d) Caution growers never to use additional nitrogen where calcium cyanamid was used to control weeds.
- e) Warn that the use of cottonseed meal and similar organic fertilizers has been found to contribute to "damping off" in some seasons.
(Show slides of tobacco plants in plant beds correctly fertilized.)

4. Seeding the plant bed.

- a) Stress sowing correct amount of seed for best plants (two to three level teaspoons per 9 x 100 feet bed). Note that plants may be weak and spindly when a heavier amount of seed is used.
- b) State that March 1 to March 15 has proven to be best time to sow. Note that tobacco seed do not germinate until soil temperature is 50° F. or above.
- c) Suggest that tobacco seed are so small that they must be mixed with a carrier, e.g., sand, ashes,

or fertilizer, for even distribution.

- d) Recommend firming seed into soil by tramping or packing bed with a roller. Caution to pack only when the surface of the soil is dry.
- e) Recommend immediate use of a cover after seeding to protect the seedlings from insects and cold winds and to keep the soil surface from drying.
- f) Stress importance of framing and ditching beds for protection from insects and cold. (To make this section more realistic, show how to measure out correct amounts of seed and mix with ashes or fertilizer or sand, exhibit a "canvas" or cover containing suggested 32 x 28 threads per inch. Also, show slides of local scenes stressing the above points.)

5. Discuss plant bed diseases

- a) Stress the diseases that are causing the most trouble in the state and area.
 - (1) Wildfire, a bacterial disease that causes considerable damage throughout the year on non-resistant varieties is easily identified by a circular, yellow halo surrounding a small spot of dead tissue on the leaf. May be avoided by using resistant varieties or treating beds weekly with streptomycin sulfate

or streptomycin nitrate, starting when the plants have four leaves.

- (2) Bluemold, a fungus growth that may attack plants in the bed at any stage of growth, develops during cool, damp weather. May be controlled by spraying or dusting with a suitable fungicide for prevention.
- (3) Anthracnose, a fairly new disease in Middle Tennessee and Trousdale County. Appears as whitish, or light brown shiny "freckle-like" spots on the leaves and as brown elongated spots appearing on the underside of leaf midribs and veins causing the leaf to pucker or break. May be controlled by using Ferbam weekly from the time plants are the size of a dime. (Show specimens of diseased and healthy plants, show packages of seed that are disease resistant, exhibit recommended fungicides to control blue mold, anthracnose, and "damping off." Exhibit streptomycin sulfate used to control wildfire. Show slides of diseased plant beds.)

6. Discuss plant bed insects

- a) Emphasize the importance of controlling plant bed insects by discussing and exhibiting models of

the two or three most destructive insects in the area.

- (1) Flea beetle
- (2) Aphids
- (3) Vegetable weevils and grub worms

(Also show insecticides currently recommended for control. May use cut-outs of insects on flip charts, or slides.)

7. Discuss selection of a variety

- a) Note that tobacco manufacturers constantly demand burley of high quality for use in cigarettes and that the selection of the variety is one of the important managerial aspects of the production of such tobacco.
- b) List on flip-charts the current Tennessee research recommended varieties, and explain advantages of each.
- c) Show slides of each variety.
- d) Have brief discussion by class on varieties grown and why.

(Secure identified samples of main varieties from Experiment Station, if possible or feasible.)

- C. Introduce next topics and thank class for presence and special cooperation rendered, including provision of realia for class.

D. Adjourn

III. Third Meeting

- A. Review purpose of class, survey findings, and previous lesson. Make it brief, since less than one-half of the subject matter remains to be taught and tests are to be administered.
- B. Teach tobacco production lesson number 2.
 - 1. Discuss land selection for tobacco.
 - (a) Note that a deep, well drained soil, high in organic matter is desirable.
 - (b) Indicate that usually the most productive land on the farm is best suited to tobacco.
 - (c) Suggest that it is best to select three or four good locations and rotate.
 - (d) Give experimental results from the Tobacco Station at Greenville, showing that tobacco grown in continuous culture did not yield as well, nor was the quality as good as where tobacco was grown in rotation with grass and clover. (When stressing rotation, show slides of diseases in fields where continuous cultivation has been practiced. Also show slide of well-prepared field compared to one poorly prepared.)

2. Stress the importance of thorough soil preparation.
 - (a) Recommend turning in time for crop residues to decay.
 - (b) Recommend turning cover crops at least three weeks previous to transplanting.
 - (c) Suggest that, after turning, they disc or harrow frequently until setting time for a firm and weed-free seed bed.
3. Discuss fertilization of tobacco crop in the field.
 - (a) Emphasize the fact that relatively large (but not too large) amounts of fertilizer are required for top yields of burley tobacco and that soil testing is best method of determining needs.
 - (b) Stress the importance of nitrogen, phosphorous, and potassium as nutrients of primary importance in the production of good tobacco.
 - (c) Explain the part that cover crops and manure may play in providing total nutrients needed.
 - (d) Show large colored pictures and/or slides showing N, P, and K deficiency symptoms in tobacco plants and have actual plants on exhibit.
 - (e) Show slides of methods of applying fertilizer just prior to time of setting indicating that amounts up to 300 pounds per acre may be applied in the row provided they are well-mixed with

soil, amounts in the row should be three inches below surface and beside the plant, the portion broadcast should be drilled or disced three to five inches deep and that nitrogen should be broadcast prior to setting.

4. Discuss transplanting.

- (a) State that this is done generally between May 10 and June 1 for best results. (Study shows that tobacco set by May 20 returned highest net income per acre and that late set tobacco may result in poor quality.)
- (b) Recommend pulling plants carefully to retain maximum number of roots to increase livability.
- (c) Suggest setting plants immediately after pulling by tractor drawn transplanter if possible and the use of plenty of water.
- (d) Suggest that rows be spaced 42 inches apart, plants 15-18 inches in the row for optimum development and that it requires from 8,400 to 10,000 plants to properly set an acre.

(Show slide of healthy plants pulled to show maximum roots, or live plant. Show slide of field properly spaced, and growing off well. Also, show slide of tractor transplanting.)

5. Discuss cultivation.

- (a) Stress starting as soon as soil conditions permit after plants have become established to keep weeds under control and stopping before damage to leaves and roots starts.

(Exhibit equipment currently used to cultivate tobacco with and discuss advantages and disadvantages of each.)

6. Discuss field insects.

- (a) Note that insects cause considerable loss, if not controlled. (Budworms, hornworms, flea beetles, grasshoppers and plant lice most serious pests to stress.)
- (b) Give current insecticide recommendations.
- (c) Show models of these insects, slides of them, and slides of infested fields.
- (d) Give each member current copy of U. T. Tobacco Pest Control Chart.

7. Discuss field diseases.

- (a) Stress the diseases causing damage in county and state
 - (1) Wildfire
 - (2) Blackshank
 - (3) Black root rot
 - (4) Fusarium wilt
 - (5) Mosaic

(Exhibit packages of seed of research-verified varieties that have resistance to various diseases--point out advantages and disadvantages of each. Show slides of fields infested with above diseases and make recommendations on crop rotations and other means of avoiding diseases.)

8. Discuss topping and suckering.

- (a) Indicate that failure to top and sucker retards the uniform ripening of the plant, causes yields to be lower, and causes more firing of the bottom leaves.
- (b) Note that research work at the Greeneville station shows that the acre value of tobacco topped moderately high and suckered at 7 to 10-day intervals exceeded by 25 per cent the value of the tobacco not topped and suckered.
- (c) Discuss current sucker control methods based on latest research work.
(Show topping chart--stress acre values at different stages of topping.)

9. Discuss priming

- (a) Present experimental data from burley producing states showing that one priming will, on the average, increase per acre returns from \$100 to

. \$200.

- (b) State that priming should begin before the bottom leaves are badly damaged.
- (c) Note that it generally pays to prime once, but no more.

(Show and discuss priming data on prepared chart based on research and use slides.)

10. Discuss cutting

- (a) Indicate that, on the average, greatest returns can be secured by waiting until the crop is ripe before cutting.
- (b) Recommend cutting when the middle leaves show a distinct yellow tinge.
- (c) Suggest use of a sharp tomahawk knife, cutting two rows at a time, spearing directly on tobacco sticks stuck in the ground and putting five or six stalks per stick.
- (d) Note that after cutting tobacco should be allowed to wilt for one or two hours, then hauled directly to barn. (Sticks to be placed 10 to 14 inches apart on tier rail.)
- (e) Suggest that those who do not have adequate barn space or ventilation may place sticks of tobacco on scaffold for one to three days.
- (f) Caution that leaving harvested tobacco in the

field for partial curing on sticks is a risky practice.

(Show hands of tobacco that were cut when ripe and compare to green cut tobacco. Also, show slides of proper harvesting procedure.)

11. Discuss housing.

- (a) Note that approximately one-third of the sides of the barn should be on hinges in order to regulate ventilation and that the barn should be located so as to have proper air drainage.
- (b) Suggest filling the barn a "bent" at a time from top to bottom and to avoid hanging fresh-cut tobacco under tobacco harvested earlier (moisture in fresh tobacco will cause the partly cured tobacco to darken in color).
- (c) Indicate that curing with artificial heat is becoming more prevalent and discuss different methods, and advantages of each.

(Show model of properly constructed tobacco barn.)

12. Discuss preparation for market.

- (a) Disclose that though many farmers do an excellent job of producing a good crop of tobacco, they lose money by failing to prepare it properly for market.

- (1) Show slides on proper methods of bulking non-stripped tobacco (pack on platform with three or four inches of air space underneath).

13. Discuss stripping and sorting.

- (a) Indicate that tobacco is ready to strip when leaves are thoroughly cured, the midrib is dry, and when in light case.
- (b) Give advantages of using fluorescent light equipped with daylight tubes, for a constant source of unchanging light or use of natural light from a northern exposure. (This is a critical point in preparing for market--show a daylight fluorescent light fixture equipped with daylight tubes.)
- (c) Give advantages of using properly constructed grading or stripping room.

14. Discuss groupings.

- (a) Explain that a knowledge of the various leaf groupings and their usage will enable farmer to do a good job of stripping.
 - (1) Show that leaves are produced on stalk in this order--flyings, lugs, leaf, and maybe tips, depending on length. (Identify section of stalk where grown.)

- (2) Stress separation of groupings and explain how and where each is used in the tobacco manufacturing process.

(Exhibit live stalk of tobacco to show where groupings are on stalk. Use cured properly graded hands of tobacco to illustrate color difference in grades and groupings.)

15. Discuss tying procedure

- (a) Suggest that tobacco be tied uniformly in hands about the size of a silver dollar.
- (b) Warn that extremely large hands will not dry uniformly when put through a drying machine, and are subject to discount by the buyers.
- (Call attention to exhibit of properly tied hands of tobacco and one tied too large.)

16. Discuss bulking after stripping.

- (a) State that, after stripping, tobacco should be placed in a bulk and left until time to take to market with heads out and tails in (in the form of a chicken pen) leaving a hollow opening in the center.
- (b) Note that empty sticks should be placed between filled sticks to allow air circulation.
- (c) State that tobacco should be hauled to market

on the stick, placed on baskets at the warehouse and kept covered until day of sale.

- (d) Caution not to hang stripped tobacco back in the barn since it may discolor and lose weight.

(Show slides of properly bulked pens of tobacco.)

17. Discuss grades of tobacco.

- (a) Note that tobacco growers should be familiar with the grading system used by Federal Graders and that a grade is determined by three factors:

- (1) group
- (2) quality
- (3) color.

(Have copy of key to Standard Grades for Burley Tobacco secured from a Federal Grader, have members of class to grade several hands of tobacco.)

C. Administer tests

1. General Principles True-False Test.
2. Recommended Tobacco Practices Checklist B (see Appendix H).

Explain that the above completes the series of tobacco classes, and in order to see how far we have progressed and in order to determine how much we may want at another time, ask the growers to fill out two short benchmarks.

- D. Make announcements. Offer to mail results of two benchmarks to individuals later if desired. Ask if group thinks class should be taught another year. Explain other helps available. Express appreciation.
- E. Adjourn.

CHAPTER V

EVALUATION OF THE INTENSIVE TEACHING APPROACH

I. A GENERAL EVALUATION

The interest of the group attending the three teaching sessions was at a high level, there being an average attendance of thirty tobacco growers. They arrived early and were ready for the class to start at the set hour, 7:00 p.m. A total of 19 attended all three sessions and took all tests given.

Cooperation shown by members of the class toward the instructor was excellent. They were very willing to take the pre-tests and post-tests.

The growers made a genuine effort to do their best, and seemed to realize the importance of the tests.

No apparent antagonism seemed to exist among members of class toward fellow members or toward the instructor.

Several members of the class were very helpful in providing realia (one was a tobacconist and brought some examples of properly tied and improperly tied hands of tobacco to the class).

All members of the class recommended that similar instructional periods be held during the winter of 1964-1965 for all interested Trousdale County tobacco growers and become a part of the regular county Extension teaching program.

In short, then, the general response of tobacco growers to the intensive Extension teaching approach was excellent.

II. RESULTS OF THE TRUE-FALSE TEST AND DISCUSSION

As shown in Table XXXVIII, the computed t-test value for differences between means of pre-test and post-test scores made on the General Principles of Tobacco Production True-False Test by the 19 tobacco growers who attended all three sessions of the intensive teaching unit and completed all tests was not significant at the required one or five per cent level of probability. Therefore, the first null hypothesis, stating that there was no difference between scores made by growers before and after exposure to the intensive teaching unit as measured by the true-false test, was accepted.

However, as indicated in the table, the value was significant at the ten per cent level of probability--suggesting that some degree of improvement did occur that was measurable in terms of the test instrument. Larger numbers of respondents and a more refined true-false test instrument (with, perhaps, an increased number of items proven to be valid and reliable) might have made differences in test scores significant at a higher level of probability.

TABLE XXXVIII

A t-TEST COMPARISON OF BEFORE AND AFTER TOBACCO
PRODUCTION TEST SCORES

Instrument for Measurement	Computed t-Value	Tabular t-Value		
		.10 t_{18}	.05 t_{18}	.01 t_{18}
General Principles of Tobacco Production True-False Test	1.774+	1.734	2.101	2.878
Burley Tobacco Production Practice Checklist	8.771**	1.734	2.101	2.878

+Significant at the 10 per cent level of probability.

**Significant at the 1 per cent level of probability.

III. RESULTS OF THE PRACTICE CHECKLIST

AND DISCUSSION

Reference to Table XXXVIII (page 89) discloses that the computed t-test value for differences between means of pre-test and post-test scores made on the Burley Tobacco Production Practice Checklist by the 19 growers was highly significant. Therefore, the second null hypothesis, stating that there was no difference between scores made by growers before and after exposure to the intensive teaching unit as measured by the practice checklists, was rejected--indicating that a large degree ✓ of improvement did occur that was measurable in terms of the instrument.

Future administration of the practice checklist with the same individuals, following the next cropping season, should provide additional data for comparison with the two sets available for this study.

CHAPTER VI

SUMMARY AND CONCLUSION

Approximately 43 per cent of Trousdale County's total farm income was derived from the sale of burley tobacco in 1959, yet at the same time, Trousdale County's five-year average yield per acre (1957-1961) was 276 pounds under the state average. In 1959, a total of 1,585 acres of burley tobacco was grown on the 648 farms in the county. A study of tobacco data showed a wide variation in per acre tobacco yields, ranging from a low of 810 pounds by one Trousdale County farmer to a high of 2,800 pounds produced by another.

In 1958, the Trousdale County Agricultural Extension Program Development Committee, the State Extension Agronomy Leader, and the Trousdale County Agricultural Agent set as a long-time program objective, the production of an average of 2,000 pounds of quality tobacco per acre by Trousdale County tobacco producers. It was estimated that this would raise the farm income by roughly \$275,000.

Since data were not available concerning practices growers were presently using, Extension workers had no definite way of knowing what to emphasize to help tobacco growers increase yields. Therefore, this study was made with these purposes: 1) to determine present production levels and identify production practices of tobacco producers in Trousdale County and use data

as a basis for formulating an educational approach for use in teaching research-verified tobacco production practices to growers in Trousdale County, and 2) to use and evaluate the educational approach.

I. SUMMARY OF FINDINGS

Five year, 1957 through 1961, average per acre yield data were computed for all 555 tobacco growers in the county. A frequency distribution chart was made of growers by 100 pound yield category. Nineteen per cent of the 555 growers had averaged producing considerably below average (under 1,300 pounds per acre) yields, 33 per cent were in the below average (1,300-1,599 pounds) yield group, 35 per cent had produced above average yields (1,600-1,899 pounds) and thirteen per cent had produced considerably above average yields (1,900 or more pounds). Twenty-seven growers were selected for interview in each of the four yield groups by stratified random sampling techniques.

An interview schedule form including family, personal and production practices was prepared and used to collect data from the 108 farmers selected.

✓ Growers in the two above average yield groups were found to be following more research-verified practices than those in the below average yield groups.

✓ Analysis of data according to race and sex showed that four of the five negro farm owners were in below average groups, and

the other one was in the above average group. None were in the considerably above average group. / Also, 13 of the 15 women farm owners had below average yields. / There was a tendency for larger percentages of the white male owners to be in the above average group than was true with women and negroes. / There was no clear relationship between farm size and per acre yield.

/ A higher percentage of farm owners fell in the two above average categories than was true with sharecroppers growing tobacco.

/ Eighty-seven per cent of the farmers interviewed were 40 years of age or older, however, no trend was shown relating yield levels to any definite age category.

Data comparing educational level with yield level appeared to be inconsequential.

/ Trousdale County is one of the counties in the state having a previous history of heavy blackshank infestation. However, the present study showed that blackshank disease was less of a problem than formerly since almost 85 per cent of the farmers interviewed reported growing Burley 37, a variety described as being moderately resistant to blackshank. Data showed that a slight yield advantage may appear to exist in favor of those reporting no blackshank.

/ Approximately 30 per cent of the farmers interviewed in this study reportedly were following soil test recommendations. A slightly larger percentage of the farmers in the above average

groups were following soil test recommendations that was true of farmers in below average groups.

- Fertilizer usage data showed that farmers in the higher yield groups reported using larger amounts of commercial fertilizers than was true of those in the below average yield groups.

- More than one-half of the farmers in the above average yield groupings reported using the research-recommended 50 pounds per 100 square yard of plant bed.

- Time of transplanting was shown to be of importance. Low yield producers in this study transplanted at medium to late dates in the season; while most of the high producers were transplanting before May 20.

- Following summarization of the survey data an intensive teaching approach was developed for teaching burley tobacco production principles and practices to all interested growers who had been interviewed. A true-false test was developed for use both before and after teaching to determine progress made in terms of knowledge of burley tobacco subject matter. Also, two recommended tobacco production practice checklists were developed for comparing past practices (before teaching) with growers' plans for 1964 (at the close of the three teaching sessions).-

The statistical technique used for analyzing the data was a modified Student's t-test. - Differences between scores received on true-false tests and practice checklists administered before and after teaching were the observations used for analysis. - The

one and five per cent probability levels were selected for testing significance.

Findings Regarding Hypotheses Tested

A t-test comparison of before and after tobacco production test scores made on the General Principles of Tobacco Production True-False Test by 19 growers, who attended all three sessions of the intensive teaching unit and completed all tests, disclosed that mean differences were not significantly different. Therefore, the first null hypothesis, stating that there was no difference between scores made by growers before and after exposure to the intensive teaching unit as measured by the true-false test, was accepted.

The t-test comparison of before and after tobacco production test scores made on the Burley Tobacco Production Practice Checklist by the 19 growers disclosed that means were significantly different--significant improvement being indicated. Therefore, the second null hypothesis, stating that there was no difference between scores made by growers before and after exposure to the intensive teaching unit as measured by the practice checklists, was rejected.

II. CONCLUSION

Since evaluation of the intensive teaching unit by means of general appraisal and use of the Burley Tobacco Production

Practice Checklist did show the approach to be effective, it is concluded that the unit developed for use and testing in this study successfully achieved the objective intended.

III. RECOMMENDATIONS

Recommendations which appear to be pertinent would include the following:

1. Further investigations similar to the present study should be conducted to develop and test this intensive teaching approach and others. Data assembled for use in the present study could be compared with those obtained from other such studies.
2. Findings from the present and similar studies should be used as a basis for development of a suggested county approach for use in teaching tobacco production to growers in Tennessee counties where burley is produced.
3. Work similar to that mentioned above could be undertaken in other crop and livestock areas of importance in Tennessee.

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APPENDIXES



APPENDIX A

TROUSDALE COUNTY TOBACCO GROWER INTERVIEW SCHEDULE FORM*

NAME _____ ADDRESS _____ DATE _____

1. Size of Farm: Below 100 acres _____ 100-200 _____ 200 or more _____
(Small) (Medium) (Large)
2. Age: Young (below 40) _____ Medium (40-60) _____ Old (over 60) _____
3. Tobacco grown by: Owner _____ Tenant _____ Share Cropper _____
Part-time Farmer _____
4. Schooling: Grammar _____ High _____ College _____
5. Major Source of Income: Tobacco _____ Dairying _____
Livestock _____ Other _____
6. Have you had blackshank? Yes _____ No _____
7. Type of soil: Good _____ Medium _____ Poor _____ (Type) _____
8. Tons of manure applied per acre: None _____, Below 10 _____,
10-15 _____, Heavy _____
9. Followed soil test: Yes _____ No _____
10. Commercial Fertilizer--lbs. None _____, 100-300 _____,
400-600 _____, 700-1,000 _____, Above 1,000 ---- (Analysis) _____
11. Fertilizer placement: Broadcast _____, In row _____, Both _____
12. Fertilizer in plant bed: None _____, 25 lbs. _____, 50 lbs. _____,
100 lbs. _____. Analysis: _____
13. Plant Bed Sterilization: Burnt _____, Cyanamid _____, Gas _____
14. Time of Sterilization: Fall _____, Spring _____

*Adapted from Lowe (5).

15. Variety: Ky. 16 ____, Burley 2 ____, 11A or 11B ____,
Burley 21 ____, B. 37 ____
16. Rate of Seeding (teaspoonful) 2 ____, 3 ____, 4 ____, 5 ____
17. Plant bed weed infestation: None ____, Some ____, Much ____
18. Quality of Plants: Excellent ____, Good ____, Fair ____,
Poor ____
19. Were plant bed insecticides used? Yes ____, No ____
20. Insect control: Good ____, Fair ____, Poor ____
21. Transplanting: Early ____, Medium ____, Late ____
22. How transplanted: Hand ____, Machine ____
23. Rotation: Tobacco after tobacco ____, 1 in 2 ____, 3 year ____
24. Cover crop turned: Yes ____ No ____
25. Kind of cover crop: Small Grain ____, Grain and Clover ____,
Clover ____, Grass ____
26. Cultivation: Deep ____, Shallow ____
27. Width between rows (feet): Less than 3 ____, 3 ____, $3\frac{1}{2}$ ____
28. Spacing in Row (inches): 10 ____, 12 ____, 14 ____, 16 ____,
18 ____, 20 ____
29. Uniformity of Stand: Good ____, Medium ____, Poor ____
30. Topping, when: Early ____, Medium ____, Late ____
31. Topping, how: High ____, Medium ____, Low ____
32. Sucker Control: Hand ____, Chemical ____
33. Sucker Control: Complete ____, Some ____, Poor ____
34. Disease Damage: Much ____, Some ____, None ____
35. Insect Damage: Much ____, Some ____, None ____

36. Stage of harvest: Ripe ____, Green ____
37. No. days harvested after topping: Immediately ____, Week ____,
2 Weeeks ____, 3 Weeks ____, More ____
38. Was tobacco primed? Yes ____, No ____
39. Farmer's reason for: high ____, low ____, no higher ____
yield. _____
40. How many grades did you separate your tobacco into last
year? _____
41. What did your tobacco sell for per pound? _____
42. How many dollars per acre gross income? _____

APPENDIX B
TABLE XXXIX

PLANT POPULATION FOR DIFFERENT ROW WIDTHS AND SPACINGS WITHIN ROWS

by
W. L. Parks, University of Tennessee Agronomy Department

January, 1964

Spacing Within Rows (Inches)	Distance between rows (Inches)											
	16	18	20	22	24	26	28	30	32	34	36	38
4	98,013	87,120	78,411	71,280	65,340	60,315	56,007	52,272	49,005	46,122	43,560	41,268
6	65,342	58,080	52,274	47,520	43,560	40,210	37,338	34,848	32,670	30,748	29,040	27,512
8	49,007	43,560	39,206	35,640	32,670	30,158	28,004	26,136	24,503	23,061	21,780	20,634
10	39,205	34,848	31,364	28,512	26,136	24,126	22,403	20,909	19,602	18,449	17,424	16,507
12	32,671	29,040	26,137	23,760	21,780	20,105	18,669	17,424	16,335	15,374	14,520	13,756
14	28,004	24,891	22,403	20,366	18,669	17,233	16,002	14,935	14,001	13,178	12,446	11,791
16	24,503	21,780	19,603	17,820	16,335	15,079	14,002	13,068	12,251	11,531	10,890	10,317
18	21,781	19,360	17,425	15,840	14,520	13,403	12,446	11,616	10,890	10,249	9,680	9,171
20	19,603	17,424	15,682	14,256	13,068	12,063	11,201	10,454	9,801	9,224	8,712	8,254
22	17,821	15,840	14,257	12,960	11,880	10,966	10,183	9,504	8,910	8,386	7,920	7,503
24	16,336	14,520	13,069	11,880	10,890	10,053	9,335	8,712	8,168	7,687	7,260	6,878
26	15,079	13,403	12,063	10,966	10,052	9,279	8,616	8,042	7,539	7,096	6,702	6,349
28	14,002	12,446	11,202	10,183	9,334	8,616	8,001	7,467	7,001	6,589	6,223	5,895
30	13,068	11,616	10,455	9,504	8,712	8,042	7,468	6,970	6,534	6,150	5,808	5,502
32	12,252	10,890	9,801	8,910	8,168	7,539	7,001	6,534	6,126	5,765	5,445	5,159
34	11,531	10,249	9,225	8,386	7,687	7,096	6,589	6,150	5,765	5,426	5,125	4,855
36	10,890	9,680	8,712	7,920	7,260	6,702	6,223	5,808	5,445	5,125	4,840	4,585
38	10,317	9,171	8,254	7,503	6,878	6,349	5,895	5,502	5,158	4,855	4,585	4,344
40	9,801	8,712	7,841	7,128	6,534	6,032	5,601	5,227	4,901	4,612	4,356	4,127
42	9,335	8,297	7,468	6,789	6,223	5,744	5,334	4,978	4,667	4,393	4,149	3,930

APPENDIX C

GENERAL PRINCIPLES OF BURLEY TOBACCO PRODUCTION

- | | <u>True or</u>
<u>False</u> |
|--|--------------------------------|
| 1. The success of a tobacco crop often depends upon an adequate supply of good, early, healthy plants. | _____ |
| 2. A deep, well drained, loamy soil is most suitable for tobacco. | _____ |
| 3. Locate the tobacco bed in a warm sunny place. A northern exposure will produce the earliest and best plants. | _____ |
| 4. Plant beds should be located close to a good water supply. | _____ |
| 5. Prepare plant bed in fall. Burning will control weed seed if properly done. | _____ |
| 6. Methyl bromide gas treatment has consistently given good weed control. | _____ |
| 7. Gas should be used in the spring for best results. | _____ |
| 8. "Vapam," Mylone," Beddrench" are other chemicals that may be used to control weed seed in bed. | _____ |
| 9. Calcium cyanamid is a nitrogen material, which is toxic to weed seed on contact, and should be used September 1 - October 15. | _____ |
| 10. Cyanamid requires very little moisture for success. | _____ |
| 11. Too much fertilizer may injure plants. | _____ |
| 12. The use of cottonseed meal and other organic materials has caused damping off in some seasons. | _____ |
| 13. A bed 75 to 100 feet long and 9 feet wide will provide sufficient plants to set an acre. | _____ |
| 14. March 1 to March 15 is most satisfactory time to seed beds. | _____ |

15. Tobacco seed do not germinate until soil temperature reaches 50° F. _____
16. Wood ashes, fertilizer, or sand may be used to sow seed with for a uniform distribution. _____
17. Going over bed once with seed should always get a uniform stand. _____
18. Seed beds should never be tramped or packed. _____
19. Tobacco bed covers (canvas) should be laid flat on ground. _____
20. Wildfire is not a problem in Trousdale County. _____
21. Bluemold is a fungus disease that may attack plants at any stage of growth. _____
22. Anthracnose is becoming a problem in Trousdale County and Middle Tennessee _____
23. Green scum on plant beds is caused by fertilizer. _____
24. Cold injury causes bud leaves to turn blue. _____
25. Plants can be dusted with DDT immediately before pulling to give protection in the field for several days. _____
26. The selection of a tobacco variety is one of the most important steps in producing high quality tobacco. _____
27. Burley 21, Burley 37, Burley 11A and 11B were all developed at the Kentucky Tobacco Experiment Station. _____
28. With the tobacco diseases that we have, it is advisable to find your best field and grow tobacco there year after year. _____
29. Experiments show that yield and quality are both better following continuous culture. _____
30. A good cover crop may provide as much as 50 lbs. of actual N. per acre and should be turned one week before setting. _____
31. Tobacco requires relatively large amounts of fertilizer for top yields and quality. _____

32. High quality manure contains approximately 10 lbs. N, 5 lbs. phosphorus, and 10 lbs. K per ton. _____
33. Generally a convenient way to supply the nutrients needed by tobacco is by using commercially mixed fertilizer. _____
34. A soil test is the most accurate way of determining fertilizer needs. _____
35. May 10 to June 1 is considered the ideal time to set tobacco. _____
36. Carefully pulling plants from a moist bed will result in more and better feeder roots--this will increase the per cent of plants that live. _____
37. There are three methods of transplanting. Hand setting is the oldest and best. _____
38. Tobacco should not be set when the temperature is higher than 85° F. _____
39. Cultivation should be deep and continue as long as you can get through the field. _____
40. The hornworm probably does more damage than any insect in our county. _____
41. Blackshank can be spread by man, implements, and by setting diseased plants. _____
42. Black root rot causes plants to wilt in the middle of the day, but they recover later in the day. _____
43. It pays to top and control suckers. _____
44. Probably the best method is to cut tobacco and leave it in the field for several days to lose excess moisture. _____
45. Many farmers do a good job of producing a crop of tobacco but fail to prepare it properly for the market. _____
46. Tobacco is ready to strip when leaves are thoroughly cured, the midrib is dry, and when in light order. _____

47. If it is not possible to strip by flourescent lights,
then natural light from an eastern exposure is best. _____
48. Burley leaves are produced on the stalk in this order:
lugs, flyings, leaf and may be tips. _____
49. Always hang stripped tobacco back in the barn. _____
50. A grade of burley tobacco is determined by three
factors: group, quality and color. _____

APPENDIX D

SURVEY FACT SHEET

108 Trousdale Burley Growers

- ✓ 1. This study was made during the summer and fall of 1963. It involved 108 Trousdale County farmers.
2. The study was made to 1) determine the present production levels of Trousdale County tobacco producers, 2) to identify the production practices that contribute to high, medium and low yields, 3) to develop an outline for teaching research tobacco production practices, 4) to actually teach a series of classes, 5) to develop an evaluation technique that might be used by any agent in teaching tobacco production.
- ✓ 3. The twelve 100 pound levels of tobacco yields in the study were divided into four groups: 1) considerably below average (below 1,300 pounds per acre), 2) below average (1,300 - 1,599 pounds per acre), 3) above average (1,600 - 1,899 pounds per acre), 4) considerably above average (1,900 or more pounds per acre).
4. Data were obtained in regard to 36 individual production practices.
- ✓ 5. Ninety-three (86 per cent) of the farms surveyed were owned by men, fifteen or 13 per cent owned by women, five or 4.8 per cent by negro men. Four of the five negro men were in the below average group. Thirteen of the 15 women farm owners had below average yields.
- ✓ 6. Fourteen (13 per cent) of the 108 interviewed were below 40 years of age; 57 per cent 40 to 60 years of age and 30 per cent were over 60. No significant difference in yield levels due to age group.
- ✓ 7. Seventy-seven per cent of the 108 reported tobacco as their major source of income.
- ✓ 8. Blackshank was not currently affecting yields of those interviewed since 88 of the 108 reported growing Burley 37.
- ✓ 9. Seventy-three per cent (or 78 of the 108) used 1,000 or more pounds of commercial fertilizer per acre.

- ✓ 10. Ninety-three per cent used more than 50 and less than 101 pounds per 9' x 100' of plant bed. Seventy-seven per cent used 50 pounds per 9' x 100' bed.
- ✓ 11. Forty-seven per cent used cyanamid, 27 per cent used methyl bromide, 10 per cent burned, and 15 per cent used two methods.
- ✓ 12. Ninety-one per cent reported using blackshank resistant varieties--84 per cent Burley 37, 7 per cent Burley 11A or 11B, and 5 per cent used two or more varieties.
- ✓ 13. Ninety-six farmers (or 89 per cent) reported using 2 to 3 level teaspoons of seed per 9' x 100' bed.
- ✓ 14. Low yield producers transplanted from mid-period to late. High yield producers transplanted by or before May 20. Seventy-seven per cent set by machine.
- ✓ 15. Seventy-one per cent reported that they grew tobacco in continuous culture.
- ✓ 16. Ninety-two per cent reported turning under cover crops. Most higher yielders used rye alone.
- ✓ 17. Seventy per cent let tobacco stand three weeks or more after topping.
- ✓ 18. Sixty-six per cent reported topping at a "medium" state (40 to 75 per cent of the plants in bloom).
- ✓ 19. Over 50 per cent of the above average group used chemical sucker control, while approximately 25 per cent of the below average groups did also.
- 20. Fifty-two per cent reported some evidence of insect damage. The flea beetle was reported as the most difficult to control.
- 21. Fourteen per cent reported priming tobacco once.
- ✓ 22. Eighty-two per cent reported making three grades of tobacco, 5 per cent two grades, and 13 per cent four grades.

APPENDIX E

COOPERATIVE EXTENSION WORK
AGRICULTURE AND HOME ECONOMICS
STATE OF TENNESSEE

Hartsville, Tennessee
February 17, 1964

TO: 108 SELECTED TROUSDALE TOBACCO GROWERS

Dear Sir:

You will remember that during the summer or fall of last year (1963) I asked for your help on an interview on your Burley Tobacco Production Practices. I promised, in turn for your help, that we would hold a series of tobacco meetings where discussion would be held on the outcome of this study; and an opportunity to discuss recommended burley tobacco production practices would be given you.

The study has been summarized and we are now ready to hold these classes.

Therefore, would you please make your plans to attend three tobacco production classes beginning Monday night, February 24th., and continuing the following two Monday nights.

You may feel free to invite a neighbor, provided you urge him to attend all three meetings.

Thank you for helping me with the tobacco questionnaire and I sincerely hope that you can and will attend the classes.

Please fill out the enclosed card and return by Saturday, the 22nd.

Sincerely,

Clyde Webster
County Agricultural Agent

CW:kd
Enclosure

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
THE UNIVERSITY OF TENNESSEE COLLEGE OF AGRICULTURE AND U. S. DEPARTMENT OF
AGRICULTURE COOPERATING IN FURTHERANCE OF ACTS OF MAY 8 AND JUNE 30, 1914
AGRICULTURAL EXTENSION SERVICE, V. W. DARTER, DIRECTOR

Please fill out this card and return to me by Saturday,
February 22, 1964.

Clyde Webster, County Agent

+ + + + + + + + + +

Yes, I plan to attend the three tobacco classes _____

No, I am not interested _____

Your Name _____

Figure 1. Self-addressed announcement of tobacco classes.

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
THE UNIVERSITY OF TENNESSEE COLLEGE OF AGRICULTURE AND U. S. DEPARTMENT OF
AGRICULTURE COOPERATING IN FURTHERANCE OF ACTS OF MAY 8 AND JUNE 30, 1914
AGRICULTURAL EXTENSION SERVICE, V. W. DARTER, DIRECTOR

Hartsville, Tennessee
February 28, 1964

Dear

I am real pleased that you have enrolled in the series of tobacco classes. I hope that you enjoyed the first class.

Our next topic for discussion will be "Recommended Practices for Growing Burley Tobacco."

I am looking forward to seeing you Monday night, March 3, 7 o'clock, at the Vo-Ag. Building

Sincerely,

Clyde Webster, County Agent

Figure 2. Announcement of second tobacco instruction session.

APPENDIX F

RECOMMENDED TOBACCO PRODUCTION PRACTICE CHECKLIST A FOR TROUSDALE COUNTY, TENNESSEE

Name _____ Address _____

APPROVED PRACTICE	YES	NO
PRODUCING PLANTS:		
1. Did you select well-drained, loamy soil with southern or southeastern exposure? (1963)	___	___
2. Did you burn or use a recommended chemical for weed control?	___	___
3. Did you use 50 to 75 lbs. of 4-12-8 fertilizer, or its equivalent, for each 9' x 100' bed?	___	___
4. Did you sow 2 to 3 struck teaspoons of seed for each 9' x 100' bed?	___	___
5. Did you sow the seed between March 1 and March 15?	___	___
6. Did you water the bed when crust formed on surface of the soil?	___	___
7. Did you control disease based on SP-91?	___	___
8. Did you control insects based on SP-91?	___	___
SELECTING RECOMMENDED VARIETIES:		
9. Did you select one or more of the following varieties? (Burley 21, Burley 37, Burley 11-A, Burley 11-B, Kentucky 16 or Burley 1)	___	___
USING ROTATION:		
10. Did you grow tobacco following grass or grass-legume sod?	___	___

CHECKLIST A (continued)

	APPROVED PRACTICE	YES	NO
FERTILIZING:			
11.	Did you fertilize according to soil test recommendations?	___	___
12.	Did you use not more than 10 tons of manure per acre?	___	___
13.	Have you had your soil tested in the last two years?	___	___
TRANSPLANTING:			
14.	Did you transplant good, stocky, disease-free plants?	___	___
15.	Did you transplant between between May 15 and June 1?	___	___
16.	Did you set plants 15" to 18" apart in 42" rows?	___	___
CONTROLLING INSECTS:			
17.	Did you control insects based on SP-91?	___	___
CULTIVATING:			
18.	Did you cultivate shallow to control weeds?	___	___
TOPPING:			
19.	Did you top tobacco when 30 to 50 per cent of plants were in the early bloom stage?	___	___
SUCKERING:			
20.	Did you keep suckers pulled?	___	___
HARVESTING:			
21.	Did you prime once to save bottom leaves while allowing remainder of the plant to ripen?	___	___
22.	Did you harvest the tobacco when it was ripe?	___	___

CHECKLIST A (continued)

APPROVED PRACTICE	YES	NO
HOUSING:		
23. After cutting, did you house tobacco after it had wilted sufficiently for handling?	—	—
PROVIDING AMPLE SPACE:		
24. Did you place 5 to 6 stalks per stick?	—	—
25. Did you hang sticks 10" to 12" apart on tier rails?	—	—
STRIPPING AND SORTING:		
26. Did you begin stripping and sorting after tobacco had thoroughly cured? (not when stems are too fat or when in too high case)	—	—
KEEPING PRIOR TO PLACEMENT ON WAREHOUSE FLOOR:		
27. After stripping did you place the tobacco in square open center bulk for keeping prior to placing on warehouse floor?	—	—
PLACING ON WAREHOUSE FLOOR:		
28. Did you make sure crop was dry and clean when placing on warehouse floor for sale?	—	—

APPENDIX G

RECOMMENDED TOBACCO PRODUCTION PRACTICE CHECKLIST B

FOR TROUSDALE COUNTY, TENNESSEE

Name _____ Address _____

APPROVED PRACTICE	YES	NO
-------------------	-----	----

PRODUCING PLANTS:

1. Do you plan to select well-drained, loamy soil with southern or southeastern exposure? (1964) ___
2. Do you plan to burn or use a recommended chemical for weed control? ___
3. Do you plan to use 50 to 75 lbs. of 4-12-8 fertilizer or its equivalent, for each 9' x 100' bed? ___
4. Do you plan to sow 2 to 3 struck teaspoons of seed for each 9' x 100' bed? ___
5. Do you plan to sow the seed between March 1 and March 15? ___
6. Do you plan to water the bed when crust forms on surface of soil? ___
7. Do you plan to control disease based on SP-91? ___
8. Do you plan to control insects based on SP-91? ___

SELECTING RECOMMENDED VARIETIES:

9. Do you plan to select one or more of the following varieties? (Burley 21, Burley 37, Burley 11-A, Burley 11-B, Ky. 16 or Burley 1) ___

USING ROTATION:

10. Do you plan to grow tobacco following grass or grass-legume sod? ___

CHECKLIST B (continued)

APPROVED PRACTICE	YES	NO
FERTILIZING:		
11. Do you plan to fertilize according to soil test recommendations?	___	___
12. Do you plan to use not more than 10 tons of manure per acre?	___	___
13. Do you plan to have your soil tested every two years?	___	___
TRANSPLANTING:		
14. Do you plan to transplant good, stocky, disease-free plants?	___	___
15. Do you plan to transplant between May 1 and June 1?	___	___
16. So you plan to set plants 15" to 18" apart in 42" rows?	___	___
CONTROLLING INSECTS:		
17. Do you plan to control insects based on SP-91?	___	___
CULTIVATING:		
18. Do you plan to cultivate shallow to control weeds?	___	___
TOPPING:		
19. Do you plan to top tobacco when 30 to 50 per cent of plants are in the early bloom stage?	___	___
SUCKERING:		
20. Do you plan to keep suckers pulled?	___	___
HARVESTING:		
21. Do you plan to prime once to save bottom leaves while allowing remainder of the plant to ripen?	___	___
22. Do you plan to harvest the tobacco when it is ripe?	___	___

CHECKLIST B (continued)

APPROVED PRACTICE	YES	NO
HOUSING:		
23. After cutting, do you plan to house your tobacco after it has wilted sufficiently for handling?	___	___
PROVIDING AMPLE SPACE:		
24. Do you plan to place 5 or 6 stalks per stick?	___	___
25. Do you plan to hang sticks 10" to 12" apart on tier rails?	___	___
STRIPPING AND SORTING:		
26. Do you plan to begin stripping and sorting after tobacco has thoroughly cured? (not when stems are too fat or in too high case)	___	___
KEEPING PRIOR TO PLACEMENT ON WAREHOUSE FLOOR:		
27. After stripping, do you plan to place the tobacco in square open center bulk for keeping prior to placing on warehouse floor?	___	___
PLACING ON WAREHOUSE FLOOR:		
28. Do you plan to make sure crop is dry and clean when placing on warehouse floor for sale?	___	___