Please return

NORTH CAROLINA

AGRICULTURAL EXTENSION SERVICE

ANNUAL REPORT

for

1961.

Period covered: December 1, 1960 to December 31 1961.

Name of Project: Farm Forestry Extension Work

Covering work done by J. L. Gray, In Charge, Forestry Extension; W. M. Keller, Head, Forest Management Extension Section; and Forest Management Extension Specialists W. M. Stanton, R. S. Douglass, J. C. Jones*, John Gilliam*, E. M. Jones, Leonard Hampton, Fred E. Whitfield. Work of W. E. Keppler, Head, Wood Products Section; L. H. Hobbs, Wood Products Extension Specialist; and W. T. Huxster, Wood Products Extension Specialist, covered in separate report.

Percentage of time devoted to project: 100

Date Submitted: December 22, 1961. Signed: Walter M. Keller / John L. Gray
Project Leader

Date Approved: _____, 196__. Signed: _____
Asst. State Director of Extension Work

Date Approved: _____, 196__. Signed: _____
Director of Extension Work, U. S. Department of Agriculture

* See page 25 of report.

ANNUAL REPORT

FARM FORESTRY EXTENSION WORK

NORTH CAROLINA

December 1, 1960 - December 31, 1961, Inclusive

John L. Gray, In Charge, Forestry Extension
W. M. Keller, Head, Forest Management Extension Section

R. W. Shoffner, Director

N. C. Agricultural Extension Service
N. C. State College of Agriculture and Engineering
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and
U. S. Department of Agriculture, Cooperating

State College Station
Raleigh, N. C.

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I. Results or Accomplishments by Major Work Phases

A. Tree Planting

Forest Management Extension staff members devoted approximately 10% of their time to tree planting in 1961. In recent years the state-wide trend in total number of trees planted has been downward. The mountain area, however, has been the exception to this trend; and in it tree planting has shown a sharp rise during the same period. In the fifteen-county TVA watershed area, there has been a 61% increase in number of trees planted during the past two years. This increased interest in tree planting is the result of two factors: (1) the increased production of white pine seedlings in the state nurseries, and (2) the promotion of tree-planting contests by the Forestry Committee of the Asheville Agricultural Development Council.

For many years there was a chronic shortage of white pine seedlings available for planting, and demand greatly exceeded the supply. In recent years the State Division of Forestry increased their production of white pine seedlings more than fivefold and has more than met the demand. This represents an increase

from approximately 1,000,000 seedlings annually five years ago to a present annual production of 6,000,000 seedlings. This ready availability of seedlings has played a large part in the sharp rise in tree-planting activity in the mountain area. The Extension Forestry Department took a very active part in encouraging the State Division of Forestry to increase their white pine production, and led the effort in pushing the sale of these seedlings to the small landowners.

The tree-planting contests promoted by the Asheville Agricultural Development Council also played a prominent part in this increased tree-planting activity. Free seedlings for these contests were offered by Champion Paper Company in Buncombe, Haywood, Henderson, Madison and Transylvania Counties. A total of 1,862,500 free trees were given to landowners in these five counties during the past planting season. The contest also included the six other mountain counties lying west of these five, although the Champion Paper Company free trees were not offered in them. Three hundred dollars in prize money for the contest was put up equally by the Southern Railway Company, the Appalachian Lumbermen's Club, and the Citizens Bank and Trust Company.

Leonard Hampton, Forestry Extension Management Specialist, stationed in Asheville, served during 1961 as chairman of the Forestry Committee of the Asheville Agricultural Development Council and was active in promoting these forestry contests.

The following table shows the tree-planting trend in acreage

planted in four of the five counties where Champion Paper Company has offered free seedlings during the last two years:

	1959*	1960	1961
Buncombe	280	688	461
Haywood	282	448	231
Henderson	336	564	654
Madison	55	147	328
Transylvania	Not available		

*No free seedlings offered this year.

Result demonstrations for the purpose of demonstrating the suitability of various tree species for a specific site and geographic area were established as follows:

(1) Chowan County -- 8 pine species; yellow poplar; and baldcypress
(2) Rockingham County -- 8 pine species; yellow poplar; and baldcypress
(3) Sampson County -- 6 pine species; yellow poplar; and baldcypress
(4) Carteret County -- Loblolly, longleaf and slash pine on deep sands

A pine species comparison demonstration previously established in Edgecombe County was fertilized as a test demonstration.

In cooperation with Christmas tree growers, soil samples were taken in five Fraser fir plantations as part of an effort to determine the cause of poor growth and color in certain locations. Although results were inconclusive, these tests tend to indicate a nitrogen deficiency. The study is continuing, and nitrogen is being added to see if it will affect the growth and color.

Christmas tree growers in Avery and Watauga Counties cooperated in the establishment of five result fertilization demonstrations on Fraser fir and two result fertilization demonstrations on white pine. In cooperation with other Extension specialists, weed control

chemicals were also used on these demonstration areas. On one Fraser fir plantation, a result demonstration was set up where fertilizer, herbicide, and a systemic-type insecticide were mixed together and put on in one single application in October. Results are being closely watched since the balsam woolly aphid is presenting such a serious threat to the very existence of Fraser fir.

Result demonstrations to test the adaptability of various species used for Christmas tree production in the upper Piedmont area were established as follows:

(1) Rockingham County -- initial establishment under shade
(2) Moore County -- deep sand in sandhill area
(3) Montgomery County -- deep sand in sandhill area
(4) Montgomery County -- eroded clay in lower Piedmont area
(5) Randolph County -- better than average loam in Piedmont area

A result demonstration testing the use of graded slash pine seedlings was established in 1960, and was checked and evaluated for results in 1961. This demonstration was started to show the merits of using graded seedlings on unfavorable deep sand sites. Results to date provide a good demonstration of the advantages of using graded seedlings.

In 1960, a result demonstration comparing direct seeding with planting of seedlings was established in Rockingham County. Species included in this test were white pine, Virginia pine and loblolly pine. These test plots were thoroughly checked and evaluated for effectiveness in 1961, but the preliminary results are not yet available.

The new KBC tree planting bar was used at the annual 4-H

Forestry Camp to acquaint the ninety county delegates and twelve 4-H agents attending with the advantages of this new type planting tool. This tool was also demonstrated on a TV program that had state-wide coverage. This KBC bar has been very favorably received by small landowners and contract tree planters. It has proven especially effective in the rocky and gravelly soils common in the mountain section of the state. The old-style, flat-bottomed dibble could not be used at all in rocky soils, and the mattock was the only planting tool available. The new, pointed KBC bar slips easily between rocks, and speeds up considerably the tree-planting job in the mountains.

A Farm Forestry Facts sheet (Exhibit A) entitled "Planting Baldcypress for Timber Production" was prepared by R. S. Douglass and distributed to all county agricultural agents and other interested people.

B. 4-H Forestry

Members of the management section devoted approximately 10% of their total work time to the 4-H phase of the program.

Forestry was emphasized at the Negro 4-H Conservation Camp held near Swansboro in Onslow County. Ninety-six boys and girls who were leaders in their respective forty-eight counties were to relay the instructions to other members in their home counties. Forestry Specialist W. M. Stanton spent one day with this group instructing them in the value of the nation's forests in our economy and showing them how that value could be maintained.

The following thirty-five counties had representatives entering

the demonstration phase of the 4-H Club program: Alamance, Alleghany, Anson, Ashe, Bertie, Burke, Carteret, Caswell, Catawba, Cleveland, Currituck, Davidson, Duplin, Edgecombe, Guilford, Hertford, Hoke, Hyde, Iredell, Jones, Lenoir, Moore, Onslow, Orange, Pasquotank, Pitt, Polk, Rowan, Sampson, Stokes, Surry, Vance, Wake and Wilson. All six Extension districts declared a winner, and each winner received an expense-paid trip to State 4-H Club Week held in July at North Carolina State College in Raleigh. This six district winners entered state competition during 4-H Club Week. Joey Warren of Sampson County was the state winner and received a wrist watch as his prize.

Long-time 4-H forestry record books were received from the following twelve counties: Alexander, Bertie, Chatham, Cherokee, Cumberland, Davidson, Hertford, Jackson, Moore, Transylvania, Vance and Wilkes. The state winner was Stuart Harris from Vance County, and he received an all-expenses-paid trip to the National 4-H Club Congress held in Chicago in November, 1961.

The seventh annual 4-H Forestry Camp was held at Camp Millstone during the week of August 14 - 19, 1961. This camp was co-sponsored by the Agricultural Extension Service and the Southern Bell Telephone and Telegraph Company. Ninety boys from eighty-eight different counties attended the camp. These boys were selected by county Extension workers on the basis of previous interest or activities in forestry and their ability to serve as forestry leaders in their local communities upon their return from camp training.

Two assistant county agents were selected from each administrative Extension district to attend camp as counselors. Those attending were:

Dalton Proctor ————	Caswell County
Beaman Nance ————	Jones County
Dick White ————	Swain County
Frank Williams ————	Hoke County
Charles Steelman ————	Yancey County
Luther Broaddus ————	Chatham County
Ralph Sasser ————	Duplin County
Charles Cone ————	Edgecombe County
R. F. Barber ————	Polk County
Ross Knowles ————	Washington County
A. R. Searcy ————	Gaston County
John Davis ————	Franklin County

Avery County won the blue ribbon for 4-H exhibits at the State Fair with a booth featuring the growing of Fraser fir for Christmas trees. Leonard Hamtpon, forestry specialist, worked closely with Avery County Agent Sam Cartner in the planning and setting-up of this exhibit.

The forestry specialists assisted with the Southern Regional 4-H Conference held at Fontana Village. Forestry specialists also conducted 4-H forestry workshops in Buncombe, Swain and Yancey Counties.

C. Brushland Conversion

The Extension management staff devoted approximately 20% of their time to this phase of work.

Conversion of brushland to production of merchantable timber continues to be the greatest problem and challenge facing forest managers in North Carolina, and is also the biggest barrier to greater participation by the small farmer in the state tree-planting program. The State Forester and the Extension Forester are working closely together on this tree-planting program, but they both face the same obstacle to increasing tree-planting activity by the small farmer. It is basically an economic problem. The average-sized

farm in North Carolina is only 60 acres, with slightly less than 30 acres in cleared land. With less than 30 acres of cleared land on his farm, any farmer is going to think twice before he plants part of it in trees. In fact, with such small acreage, it is questionable whether he could ever afford to plant part of it to trees and still make a living farming the remaining cleared land. Thus, if the small farmer is to plant more trees, he must do it by replanting his cutover woodland; and this presents real problems.

There are roughly 3,000,000 acres of cutover lands, or lands covered with worthless shrubs and trees, on the farms in North Carolina. These are potential pine-producing acres if the worthless shrubs and low-quality trees can first be removed. Unfortunately, the only way to remove them is by the use of heavy equipment and/or chemicals. The preparing of such lands for planting is referred to as "site preparation" by foresters. To prepare such areas with heavy equipment and then plant the seedlings requires a cash outlay of $30 to $50 per acre, and sometimes more. It is a sad economic fact-of-life that our small farmers are both unable and unwilling to tie up this relatively large amount of capital in such a long-time investment, usually thirty to fifty years. Their limited capital resources make it necessary that they invest their money in the short-term farming practices where they can turn it over every year or two. Until we can come up with some practical method of assisting these small landowners with this costly site-preparation problem, we are faced with a formidable barrier to any sizable increase in tree-planting activity.

In recent years considerable progress has been made along this line, but there still remains almost 3,000,000 acres needing a major overhaul to restore it to timber production. An increasing number of seedlings are being planted on cutover woodland that has been reworked by heavy equipment or chemicals, or by a combination of the two, to provide satisfactory conditions for reforestation. Heavy equipment is presently the most widely used method. Various types of machines have been used satisfactorily. The KG blade, a modified bulldozer, is gaining in use because it provides desired results at reasonable costs. Four TV shows were given using a narrated movie of a KG blade operation.

Two heavy equipment operators who work in Pasquotank and Perquimans Counties have purchased KG blades this year and are presently booked ahead for several months of work, according to Forestry Specialist W. M. Stanton.

The Boy Scout troop in Trenton, Jones County, is learning forestry by doing. A local landowner set aside 10 acres for their forestry project, and gave them the $20 ACP cost-sharing payment per acre for hardwood control (site preparation) and planting. The necessary slash pine seedlings were donated by a pulp company. The scouts did the job; and, as a result, the project was profitable for the troop and a needed service was performed for the landowner. The owner was quite pleased with the results, and has offered fifty additional acres for future projects.

A result demonstration on hardwood control using various methods and chemicals was established in Perquimans County. Methods used

were (1) frilling and chemicals, (2) girdling, and (3) tree injector applications of chemicals. Chemicals used were 2,4,5-T, and Ammate both as a crystal and in solution.

Similar demonstrations were also established in the following counties: Anson, Union (3), Montgomery, Chatham, Lincoln, Henderson, Macon, Polk, Graham, McDowell, Avery and Rockingham. The McDowell County demonstration area was 7 acres at the County Agricultural Center. Initially, the area was heavily covered with low-grade hardwoods and scattered pines. Everything merchantable was sold and the following was cut:

24.24 cords of pine pulpwood
63.79 cords of hardwood pulpwood
3,290 board feet of pine and hardwood sawlogs

After this was cut, all remaining trees 4" DBH and larger were frilled and treated with 2,4,5-T in fuel oil. All trees smaller than 4" DBH were basal sprayed with the same 2,4,5-H solution. Total cost for the 7 acres was $63.55 for chemicals and $80 for labor. This averaged out to $20.50 per acre. A controlled burn will be used to reduce slash and minimize sprouting. In early spring, loblolly, white, Virginia and shortleaf pines will be planted as a species test demonstration.

A Farm Forestry Facts sheet entitled "Chemical Timber Stand Improvement" (Exhibit B) was prepared by Forestry Specialist R. S. Douglass and distributed to all county agricultural agents and other interested persons.

D. Long-time Cooperators

Approximately 5% of the total work time of the department was

spent on this program phase.

Two long-time cooperators, Hassell Thigpen of Edgecombe County and H. C. Ferebee of Camden County, were honored with the Progressive Farmer Master Farm Family Award. On both farms forestry is an integral part of their total operation.

In the Western District the Rogers farm in Transylvania County was added to the list of long-time cooperators. The Lumac Farms Incorporated and their 2,000 acres of woodland were added to the Eastern District's long-time cooperators. The H. B. Spruill Farms Incorporated in Bertie County have started on a long-time management program. The sum of $2,500 has been budgeted for labor and materials in their yearly reforestation work. Surplus labor during December and January is to be used in the program.

A length-of-life fence post demonstration was established in Washington County. This addition brings the total of this long-time demonstration to 11 in the state.

A 361-acre tract of abandoned farm land has been made available to the Extension Service in Chatham County for educational purposes by Howard N. Butler.

This land was abandoned approximately forty years ago and has had no management since that time. Many of the fields are now stocked with pure loblolly and shortleaf pine. The wooded area at the time of abandonment was, and still is, covered with low-value hardwood.

An access road has been constructed by the owner to make all stands readily accessible for logging and fire control.

A demonstration showing thinnings and chemical control of unmerchantable hardwoods was held on the farm. Pulpwood foresters and foresters representing a creosoting firm joined with Extension foresters in presenting this management plan. See Exhibit C for copy of program.

The area is being set up as a permanent long-time demonstration, and the Forestry Extension Department is preparing a complete management plan on the area for Mr. Butler.

These six additional landowners were added to the list, making a total of 106 long-time cooperators.

E. Christmas Tree Production

Approximately 12% of the department's total work time was spent on this program phase.

Forestry Specialist John Gilliam spent full time on this program in 1961 up to September 1, at which time he went on study leave. Mr. Gilliam is attending the University of Tennessee, where he is doing graduate work in Christmas tree production and management. Upon completion of his graduate work, Mr. Gilliam will return and will be assigned state-wide responsibility for the Extension Service's Christmas tree program.

Many species of evergreens are grown in North Carolina for Christmas trees, but chief interest is centered around Fraser fir. During the past four planting seasons, the following numbers of Fraser fir have been planted:

1957-58 ———	567,100
1958-59 ———	282,500
1959-60 ———	424,375
1960-61 ———	261,750

Some 2 - 0 Fraser fir seedlings from 1960 were held over in the nursery and transplanted for sale as 2 - 1 stock in 1961. The one year in the transplant bed produced a more fibrous root system and a better-formed top. Growers are very pleased with these transplants for field plantings. However, it is the opinion of growers, nurserymen and Extension foresters that a 2 - 2 transplant will be an even better seedling. Approximately 200,000 of the 2 - 1 Fraser fir transplants will be held over for another season at the Holmes Nursery, and will be for sale to growers as 2 - 2 stock during the 1962-63 planting season.

A Christmas Tree Growers' Newsletter was prepared quarterly by Forestry Specialist Gilliam and was distributed to members of the growers' cooperative by the secretary. This newsletter furnishes factual information to the growers concerning seedling availability, latest research information from various sources, and pertinent information from the Northern markets. See Exhibit D. Forestry Specialist Leonard Hampton will continue to compile this newsletter and serve as Director at Large for the cooperative while John Gilliam is away in graduate school.

The summer (quarterly) meeting of the North Carolina Christmas Tree Growers' Cooperative was held during July in Newland, with seventy-seven growers, county agents and other interested persons present. W. K. Williams, Federal Extension Forester, was the featured speaker at the meeting. Those in attendance saw (1) the results of chemical weed and grass demonstrations in Fraser fir

and white pine, (2) chemical control of woody brush in Christmas tree plantations, (3) the use of mechanical mowing equipment in plantations to control weeds and grass, and (4) other stops of interest related to Christmas tree production.

Several weed control plots were set up in Avery County in March, 1961, to test several herbicides for their effectiveness in controlling weeds and grasses under conditions indigenous to western North Carolina. The chemicals tested and rates of application were as follows:

1. Simazine 80 W — 2, 4, 6, 8 pounds actual chemical per acre
2. Simazine 4 G — 2, 4, 6, 8 pounds actual chemical per acre
3. Atrazine 8 G — 2, 4, 6, 8 pounds actual chemical per acre
4. Diuron 80% wettable — 2, 4, 6, 8 pounds actual chemical per acre
5. Neburon 18.5% wettable — 2, 4, 6, 8 pounds actual chemical per acre

Treatments were replicated and included sites which varied from steep to slightly sloping land. Chemicals were applied over heavy debris, such as dead grasses and weeds from the previous season's growth - but before germination from annual weed and grass seeds had begun. All wettable powders were applied in one-foot-wide bands over the tops of Fraser fir seedlings planted the previous year (1960). Granular materials were broadcast with a cyclone seeder.

All concentrations of Simazine, Atrazine, and Diuron gave excellent (90% or more weed free) weed control up through the last date observed (July, 1961). Neburon gave no apparent control under the conditions of this experiment.

There was no visible injury to Fraser fir or white pine with any of the concentrations of Simazine, Atrazine, or Neburon. Diuron killed or severely injured Fraser fir at all concentrations used.

Assisting with this demonstration were Extension Foresters Hampton and Gilliam, in cooperation with the Horticulture Department at State College, County Agent Sam Cartner, and the landowners.

Hampton and Dr. Bryson James established similar weed-control plots in Watauga County using only Simazine 80W and Simazine 4G. Excellent results were obtained with these materials on these plots.

Forestry Specialists Gilliam and Hampton and the Avery County agent established a result demonstration using granular fertilizer and pellets in a Fraser fir plantation.

"Treefeed," a fertilizer in pellet form, was placed several inches under the soil and close to the root system of five-year-old Fraser fir. According to the company promoting this pellet, the fertilizer is supposed to stay active four to five years without damage to the trees. At least four different analysis pellets were used.

At least four different analyses of granular fertilizer were applied in a band around Fraser fir that was planted in the spring of 1959. About two-thirds of a frozen-juice can of the fertilizer was used around each tree. Results are inconclusive and will be for several more years, but the tests will be kept under observation for several more years.

During 1961, John Gilliam prepared two Farm Forest Facts

sheets on Christmas trees. One was written on "Shearing and Pruning White Pine and Red Cedar," Exhibit E, and the other on "Evergreen Trees Suitable for Christmas Tree Production in North Carolina," Exhibit F.

At a series of training meetings, Hampton presented a color-slide program on Christmas tree production to the Agricultural Workers Councils in Madison, Buncombe, Haywood, Mitchell, Cherokee, and Clay Counties.

Hampton, working with economist Dr. R. L. Johnstone, prepared a prospectus on Christmas tree production and marketing activities in North Carolina. This was prepared to serve as a guide to FHA supervisors when determining credit availability to growers and potential growers of Christmas trees in the state.

F. Measurement, Harvesting and Marketing

A demonstration acre to show returns and response from thinning was marked by the Extension forester on the Bertie County farm of Mr. Locke Smallwood. Sixteen cords were cut from the twenty-year-old loblolly stand. Mr. Smallwood was so elated from the appearance of the thicket after thinning that he requested the pulpwood producer to continue cutting the whole twenty-acre stand. "What other crop will give you a net return of $80 per acre from the sale of the weeds, the runts, and the deformed and leave your present stand better than before?" were his remarks.

A visit by the Extension forester and county agent netted Mr. Ivey Rhodes of Onslow County an additional thousand dollars on the sale of his timber. Mr. Rhodes, an elderly man, doing a little marginal farming, wanted to build up a little equity for

his social security. The only net income he could realize would be from the sale of some overmature pine and some premium poplar trees. Some of his poplar had been root-sprung from a severe windstorm but were still salvageable.

The Extension forester contacted several veneer log producers who would take the pine in the same operation. Even though the volume sale was not too great, Mr. Rhodes' return was 25% larger than any of the several previous bids.

Mr. T. C. Ratcliff of Pamlico County was in need of four thousand dollars to meet his obligations after a poor farming season. He had 200 acres of woodland and wanted to know what area was giving him a return of less than four per cent. He contacted the Extension forester. Several sawlog producers had been pressuring Mr. Ratcliff to cut a thirty-five-year-old stand of exceptional growth of loblolly pine.

Of the total woodland acreage, fifty acres was stocked with scattered pine, gum, poplar and oak. Acting on the advice of the Extension forester, Mr. Ratcliff hired a consulting forester, who cruised the area and handled the sale and contract. After harvest, the area is to be burned and planted.

Because he was a good businessman, Mr. Ratcliff has the money he needed; his productive pine stand is still standing; and after planting the cutover area, his total woodland acreage will be in full production.

A field demonstration outlining the economics of pulpwood, pole and sawlog sales in various-aged stands was held on the

Howard Butler forest property in Chatham County. See Exhibit C. The purpose of the demonstration was to make the landowner aware of the highest economic productivity of his woodland through the multiple sale of poles, sawlogs and the utilization of the tops for pulpwood.

To better acquaint the farmers with the processing of their forest yields, Jones County farmers toured the Riegel Paper Company mill and yard. The Cherokee County farmers became better informed on their forest products through a tour of a veneer mill, flooring and sawmill and a pulpwood yard operation.

G. Woodland Grazing Protection

Four additional grazing-damage demonstration plots were established in 1960 in the mountain counties. This brings the total to ten of these demonstration plots in the western area. These four additional demonstration plots were located in Polk, Transylvania, Graham and Cherokee Counties.

County forestry tours were held in Henderson and Yancey Counties and the grazing-damage demonstration plots were visited on both of these tours.

Approximately 3% of the total work time of the department was devoted to this phase of the program.

H. Bottomland Hardwood Management

Only about 1% of the department's total work time was devoted to this activity during 1961.

It has been obvious for many years that this phase of the forest management program has been completely neglected in North

Carolina - and, for that matter, in the entire South. To make a start on meeting this problem, Forestry Specialist E. M. Jones spent a year in graduate study at Louisiana Polytechnic Institute, majoring in bottomland hardwood management. Mr. Jones returned to the Forestry Extension staff on September 1, and since then has been working to develop an Extension forestry program in this field. See Exhibit G.

The river bottoms in eastern North Carolina have some of the finest, if not the finest, hardwood timber in the Southeastern states. There is slightly over 3,000,000 acres of this bottomland hardwood land in eastern North Carolina with a standing volume of 14 1/4 billion board feet of sawtimber ~~and~~ or 4 1/2 billion cubic ~~board~~ feet of growing stock. These figures are based on information found in the Forest Survey Release No. 49, entitled North Carolina's Timber Supply, 1955.

The potential for this hardwood timber in North Carolina is tremendous. Most of the hardwood volume now being cut is used by local industry either as raw material for the state's large furniture industry, or as veneer for baskets, boxes or panels.

The first step in this new program was to set some objectives for the first year or two. It was decided to confine the initial effort to the Roanoke River bottomlands, and gradually spread out from there to include all the bottomland hardwood lands in eastern North Carolina. To date, Mr. Jones has been mapping in all the larger landholdings, both private and industrial, along this Roanoke River basin.

Industry people have been contacted, and tentative plans have

been made for the establishment of long-time result demonstrations in hardwood cutting practices and variety plantings. Because of the lack of hardwood seedlings from the state nurseries, seed for the variety demonstration plots had to be collected this fall by Mr. Jones and the industrial foresters interested in the project. The State Division of Forestry has agreed to grow seedlings from any seed turned over to them.

John Putnam, of the Delta Research Station at Stoneville, Mississippi, and foremost authority in the United States on hardwood management, has agreed to spend some time in eastern North Carolina working with Mr. Jones and selected industry foresters to familiarize them with various cutting practices in different hardwood types.

I. Forest Insect and Disease Protection

Approximately 12% of the work time of the department was spent on this activity.

Insects and diseases capable of destroying large numbers of trees are always present in North Carolina's woodlands. The increasing number of plantations planted to a single species - many on unfavorable sites - enhances the possiblity of an outbreak into epidemic proportions.

To keep the county agents aware of these dangers, the Forestry, Pathology, Entomology and Zoology Departments joined together and put on a series of one-day training sessions on forest insects and diseases. Even though the past year has been a nearly normal year with respect to insects and diseases, it was felt that these training

programs would assist the county agents with their day-to-day work.

The meetings were held in seven different geographic locations around the state. One agent per county was authorized to attend, and in most cases it was the agent who handled the forestry and shade-tree requests in that county. In addition, personnel from FHA, SCS, ASC and the North Carolina Forest Service who were stationed in the county in which the meeting was being held were also invited to attend. The size of the group was deliberately kept small to encourage individual participation. Following is a list of the meetings held and the attendance at each:

Asheville -----	17
Concord -------	13
Clinton -------	18
Greensboro ----	21
Morganton -----	18
Nashville -----	11

Reaction to these meetings was highly favorable!

To further assist the agents and forest managers, a Farm Forest Facts sheet, Exhibit H, was prepared on the white pine weevil and distributed in the white pine-growing areas of the state.

A mimeograph on white pine blight, sometimes called emergence tipburn, was prepared and sent to areas involved to assist the agents in answering urgent inquiries that were prompted by the sudden outbreak of this mysterious disease. See Exhibit I. News stories were also prepared on this subject for release by the Extension public information office.

Another pest that caused much anxiety in the western part of the state was the elm spanworm. This pest has been infesting and defoliating valuable hardwoods in epidemic proportions for several

years. County agents were swamped with inquiries about this outbreak. Forestry Specialist Fred Whitfield held conferences with the agents in all counties involved in this spanworm epidemic. Local news articles and three radio programs were prepared during these visits with the agents.

Since 1957, an outbreak of epidemic proportions of pratti-pratti sawfly had been building up in the northern tier of counties. This outbreak subsided during 1961. However, the endemic red-headed pine sawfly appeared in many spots throughout the state. To help alleviate so many calls to the county agents' offices, a state-wide news release was sent out from the Extension Forester's office on these insects.

Forestry Specialist Whitfield was very deeply involved and concerned with the balsam woolly aphid which continued to spread in the fir stands of western North Carolina. This pest presents a serious threat to the future of Fraser fir as a major Christmas tree species in this area. Very little publicity was released on the balsam woolly aphid because of the lack of information on controls.

A cone moth (Diaryctria sp.) continued to damage young high-value pine trees in pulp and paper company seed orchards. To help the orchard manager determine when to spray to control these insects, the time of emergence had to be learned. Fred Whitfield set up cages to trap the adult insects, and by frequent observations of the cages it was possible to set up a spray schedule to control the pest.

Assistance was given a Halifax County lumber company to identify an insect infestation found in an imported shipment of lumber. The consignee feared that the insects might have been brought in from a foreign country, and was afraid of the possibility of a new introduced pest. The lumber was kept sealed in the railroad car, and Forestry Specialist Whitfield was called in to help. Examination and verification showed that the infestation was a widespread native insect that was not damaging to lumber, and the car was released.

II. Department Administration, Supervision

The department's graduate training program, under the sponsorship of the Richardson Foundation, Greensboro, N. C., saw two more of its members complete their training in 1961. Four staff members have completed work on a master's degree, and a fifth completed work on his doctor's degree. E. M. Jones completed his work and received an M.S. in Botany from Louisiana Polytechnic Institute in August, 1961. Mr. Jones majored in bottomland hardwood management during his study leave. Mr. Jones returned to his department job on September 1, 1961, and was assigned to the North Coastal area and given state-wide responsibility for the Extension program in hardwood management.

John L. Gray completed his residence requirements toward a Doctor of Forestry degree at Duke University, where he specialized in forest economics, and returned to his position as In Charge, Forestry Extension on September 1, 1961.

W. M. Keller, who acted as department head in Mr. Gray's absence, assumed his regular duties as Head, Forest Management Extension Section upon Gray's return.

The Richardson Foundation increased their yearly grant to the department to $13,000 for the 1961-62 school year; so two more staff members left for graduate study on September 1, 1961. John H. Gilliam is attending the University of Tennessee and is working toward an M.S. in Horticulture while majoring in Christmas tree production.

J. C. Jones is attending Duke University and is working toward a Master of Forestry degree while specializing in a program of forest watershed management.

During the year, two out-of-state professional meetings were attended by department staff members. R. S. Douglass attended the Southern Forest Tree Improvement Conference at Gainesville, Florida; and F. E. Whitfield attended a forest entomology workshop at Macon, Georgia.

During 1961, the management staff members conducted 310 meetings which were attended by 11,523 people. These same staff members put on 71 radio programs, 32 television programs, and prepared 23 news articles during 1961.

In addition to the monthly Farm Forest Facts sheets, many special mimeographed features were prepared and released by the department. A 30-page manuscript on Christmas Tree Production and Marketing was put in its final form by John Gilliam and sent to the printers. The bulletin has been promised from the printer for release in February, 1962.

Three staff members - J. C. Jones, F. E. Whitfield and R. S. Douglass - went on two-weeks' military training duty during 1961.

Forest Management Staff Members and Assignments

Name	Title	Area and/or Subject Matter responsibility	Headquarters
J. L. Gray	In Charge, Forestry Extension	State-wide	Raleigh
W. M. Keller	Head, Forest Management Section	State-wide	Raleigh
J. C. Jones[1/]	Forest Management Extension Specialist	Graduate-study leave	---
W. M. Stanton	" " " "	Mid-Coastal	Windsor
R. S. Douglass	" " " "	South Coastal - Planting, forest soils and site preparation - state-wide	Raleigh
J. H. Gilliam[2/]	" " " "	Graduate-study leave	---
E. M. Jones	" " " "	North Coastal - Bottomland hardwoods	Raleigh
L. H. Hampton	" " " "	Mountain	Asheville
F. E. Whitfield	" " " "	South Piedmont - Forest insects and diseases - state-wide	Raleigh

1/ Graduate-study leave, Duke University
2/ Graduate-study leave, University of Tennessee

III. Activities at the State or Area Level

A. Work with State Extension Supervisors, District Agents and Youth Leaders in Program Planning

Conferences were held between the Extension Forestry staff, state 4-H staff and other subject-matter specialists in planning the 1961 4-H Forestry Camp.

Mr. F. E. Whitfield worked closely with the District Agents in planning and organizing the series of agent-training meetings on forest insects and diseases described earlier in this report.

John Gray, W. M. Keller and E. M. Jones conferred frequently with the District Agents and the Extension Director while working out the bottomland hardwood management program (Exhibit G).

F. E. Whitfield worked closely with the 4-H department in supervising a timber sale on the Swannanoa 4-H Camp property.

Leonard Hampton and W. E. Keppler worked with the state 4-H office and handled a part of the program at the Regional 4-H Conference held at Fontana Village. In addition, Hampton helped the 4-H department hold several 4-H forestry workshops in the mountain counties.

B. Assistance Given to or Received from Other Subject-Matter Specialists

Assistance was given the School of Agriculture in conducting the annual short course in "Modern Farming," sponsored by the Agriculture Committee of the North Carolina Bankers Association.

Advice and recommendations from staff members of the School of Forestry were received in preparing mimeographed material and Farm Forestry Facts sheets.

Assistance was given to and received from the Extension Service and the School of Agriculture pathology and entomology staffs by F. E. Whitfield in planning and putting on the series of agent-training meetings on insects and diseases described earlier in this report.

H. M. Ellis, In Charge, Agricultural Engineering Extension, served as an instructor at the annual 4-H Forestry Camp.

F. E. Whitfield was called on by the forest genetics staff to assist in identifying and controlling an insect which was attacking the cones of pine trees in one of their experimental seed orchards.

Several members of the Extension staff conducted seminars, upon the request of the teaching staff, for students in the School of Forestry.

C. Assistance Given to or Received from Various State, Federal and Other Agencies or Interest Groups

Assistance in conducting classes at our 1961 Four-H Forestry Camp was received from (1) Halifax Paper Company, Inc., Roanoke Rapids, N. C.; (2) Porter Brothers, Inc., chain saw distributors of Shelby, N. C.; and (3) Sandvik Saw & Tool Corporation, New York. In addition, for the seventh consecutive year, the Southern Bell Telephone and Telegraph Company provided the financial support which made this camp possible.

Leonard Hampton served on the Board of Directors of the Asheville Agricultural Development Council, and was elected chairman of its Forestry Commission during 1961, and reelected chairman

for 1962. During 1961, Hampton prepared a forest and Christmas tree record book for distribution by the Commission. The record was prepared to assist the forest and Christmas tree grower in keeping accurate records of expenditures and receipts of operations. This booklet was distributed to county agents and other public agencies in western North Carolina.

Hampton met with TVA, U. S. Forest Service, and the General Manager of Standard Milling Company to discuss ways to encourage more charcoal production in western North Carolina.

Upon request from the School of Forestry, Hampton set up and manned a forestry booth featuring forestry education at the two-day vocational guidance clinic conducted by the Rutherford County schools.

Assistance was given to two members of the Research Triangle Institute with management plans for their woodlands in Durham County.

The forestry staff assisted the Madison-Mayodan Schools of Rockingham County with their annual outdoor education program. F. E. Whitfield instructed the fifth-grade students in forest entomology. This was a two-day, in-the-field program.

The Boy Scout Headquarters of Rockingham County was assisted in laying out a nature trail for their scout camp. Trees and shrubs were identified by common and scientific names, and permanent metal name plates were attached so as to be easily readable.

One of the most unusual requests came from the Campus Committee of the University of North Carolina at Chapel Hill. They requested assistance in determining how to handle the far-famed

"Davie Poplar" a yellow poplar that was very old and rapidly becoming a hazard to human life due to advanced decay. The tree is located in the middle of the campus, where thousands of students walk beneath it every day and were threatened by large falling branches. Because of nostalgic memories associated with this tree, many alumni from all over the country expressed concern for its preservation. The Campus Committee responsible for this tree requested assistance from the Extension Forester in determining methods to lengthen its life, yet keep it safe. Two Extension forestry specialists met with the campus tree surgeon and decided upon a very drastic pruning operation. All of the large heavy branches were removed, and not much more than the main trunk and a few small, light branches were kept. The branches pruned off weighed almost nine tons. Part of the tree still stands, however, no longer a menace to life; and all of the "old-grads" are happy that the "Davie Poplar" still stands.

W. M. Keller served as program chairman for the annual meeting of the North Carolina Forestry Association. 1961 was the 50th anniversary of the Association, and this called for something special in the way of a meeting. 1961 also happened to be the 50th anniversary of the passage of the Weeks Law, which authorized the establishment of national forests in Eastern United States. Asheville was designated by the Secretary of Agriculture as the site of a national commemorative ceremony to recognize this anniversary. The U. S. Forest Service invited the North Carolina Forestry Association to sponsor the Weeks Law celebration, and it was

decided to combine the two 50th anniversary celebrations. Keller served on a special planning committee appointed by Governor Sanford to organize the celebration, and also served as chairman of the Association's program committee. The two-day meeting was held on September 26 - 27, at the Biltmore Estate, the birthplace of American forestry, in Asheville. Over 1,000 persons attended the two-day meeting, which was highlighted by talks by Secretary of Agriculture Orville Freeman, Governor Terry Sanford, U. S. Forest Service Chief Richard McArdle, and U. S. Travel Agency Director Voit Gilmore.

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, NORTH CAROLINA COUNTIES AND UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS STATE OF NORTH CAROLINA

Exhibit A

EXTENSION SERVICE

Farm Forestry Facts

Forestry Extension Department N. C. State College, Raleigh, N. C. January, 1961

Planting Baldcypress for Timber Production

Baldcypress (Taxodium distichum (L.) Rich variety distichum) is also commonly called southern cypress, yellow crypress, gulf cypress, tidewater red cypress, and cypress. It is perhaps one of the most unusual trees found in the South. Baldcypress grows on the wettest sites, lives for centuries, and produces very durable wood.

Pondcypress (Taxodium distichum variety nutans (Ait.) Swe t) is another variety of cypress which has a more limited range, grows slower, and produces a smaller tree. This is a less desirable tree, although the wood closely resembles baldcypress.

The natural range of baldcypress extends along the Coastal Plain from southern Delaware to south Florida and west almost to the Texas-Mexico border. Inland it reaches up the Mississippi Valley to southeastern Oklahoma, southeastern Missouri, southern Illinois, and southwestern Indiana. It is usually confined to river swamps, wet areas, and stream bottoms. Most of the natural cypress occurs on very wet soils such as mucks, clays, or fine sands which stay wet much of the time. It cannot grow in dry, poor, sandy soils. The best growth is found on deep, moist, fine sandy loams with moderately good drainage. Rarely does it occur naturally on the sites where it will make the best growth because an abundant water supply is required for seed germination, and possibly because of intolerance to competition. Soil acidity seems to have no effect on its natural occurrence, but may affect its growth rate.

Baldcypress seedlings make good growth on many upland areas where they cannot reseed naturally. Trees up to sixty years old, if cut during the dormant season, will porduce vigorous sprouts which will grow into a new stand of timber. Old-growth stands grew slowly because of competition and excess water. Young cypress stands on moist but not flooded areas with little competition have produced growth about equal to many hardwoods, and have not been very poor when compared to pines on the same area. Height growth usually averages about one foot per year for the first one

(MORE)

hundred years, then slows down and reaches maximum height of about 150 feet on best sites at about 200 years old.

For best growth baldcypress needs nearly full sunlight. It can tolerate some shading, but will grow slower. When planted like pines, competition will cause natural pruning. Thinning will become necessary to maintain fast growth.

Old-growth stands yielded as much as 60,000 board feet per acre. Yields for second-growth stands are not available. However, baldcypress produces wood that is used for many purposes. There is now, and probably will continue to be, a ready market for this timber.

More research is needed to provide detailed information on growing baldcypress.

Many landowners could profit by planting baldcypress on some wet areas where pine does not make good growth.

Very truly yours,

County Agricultural Agent

Prepared by:

Ross S. Douglass
Forest Management Extension Specialist

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, NORTH CAROLINA COUNTIES AND UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS STATE OF NORTH CAROLINA

Exhibit B

EXTENSION SERVICE

Farm Forestry Facts

Forestry Extension Department N. C. State College, Raleigh, N. C. September, 1961

Chemical Timber Stand Improvement (TSI)

The use of chemicals to kill undesirable trees and shrubs is sometimes the best solution for TSI problems. Each situation must be considered carefully to determine whether or not chemicals are the most practical and economical answer to the problems involved. The following recommendations usually produce satisfactory results:

Treatment	Chemical	Time to Apply
FOLIAGE - Most woody plants susceptible to single or repeated applications. Wet leaves and stems thoroughly. Used primarily on brush less than 6 ft. high.	Mixture of 2, 4-D and 2, 4, 5-T. * 6 lbs. of acid per 100 gals. water. After July 15 add 10% diesel fuel.	During growing season. **Best results within 6 weeks after leaves full size. Satisfactory results to late summer with diesel fuel addition.
BASAL SPRAY - Thoroughly wet to runoff basal 12" of stem. Most practical and economical on brush less than 6 ft. high. Requires less labor, much more chemical.	16 lbs. acid equivalent 2, 4, 5-T* low-volatile ester per 100 gals. diesel fuel.	Effective any time of year. **
FRILL - Popular treatment for trees 4" and larger 30" above ground. Make overlapping axe cuts around tree at convenient height. Fill cut to overflowing with solution.	2, 4, 5-T:* 4 lbs. acid equivalent per 20 to 30 gals. diesel fuel. For resistant species use 20-gal. mix. Ammate: 2 lbs. per gal.	Satisfactory results any time of year. ** Most effective in spring, least effective in August and September.
NOTCH - Make axe-cut notches around tree near ground, not more than 3" apart.	1 level tablespoonful Ammate per notch.	Effective any time of year. ** Most effective in spring.
STUMPS - Wet bark thoroughly with basal spray treatment.	16 lbs. 2, 4, 5-T* acid per 100 gals. diesel fuel.	Effective any time. ** Most effective soon after cutting of tree.

Place Ammate crystals on top of stump around edge near bark. Cut small trees from both sides to produce V-top stump to hold Ammate crystals.	1 level tablespoonful per 3" of stump circumference.	Ammate crystals should be applied to stumps before top of stump dries after cutting tree. If stump is dry, place Ammate in notches as directed above.
INJECTION - Make injection cuts not more than 2" apart around tree near ground. Trees over 8" and resistant species, make cuts not more than 1" apart.	4 lbs. 2, 4, 5-T* acid per 15 gals. diesel fuel.	Effective any time. ** Most rapid results in spring.

Some species resistant to 2, 4-D and 2, 4, 5-T are: Ash, red maple, persimmon, hickory, beech.

Resistant to Ammate: White oak, beech, hickory very resistant.

Species which root sprout - such as, black locust and sassafras - are resistant to both 2, 4, 5-T and Ammate.

COMMENTS: For information on aerial application see Farm Forestry Facts, July 1958, entitled "Aerial Application of Herbicides." Comments on this fact sheet about aerial application apply equally well to our current stand on mist blowers. The term "herbicides" is not used in referring to tree-killing chemicals. 2, 4-D; 2, 4, 5-T; and Ammate are not poisonous to warm-blooded animals. Many factors - such as, species, soil moisture, method and time of application, chemical and mixture used, and others - affect results.

* When buying or using 2, 4-D or 2, 4, 5-T note statement on can label giving pounds of acid equivalent per gallon of contents. Most common on market is 4 lbs. acid equivalent per gallon. Range from 2 to 6 lbs. Also note whether the contents are intended for mixing with water or oil, and whether low-or high-volatile material.

** During crop season use care to avoid damage to crops by spray drift or volatile esters. High-volatile esters may damage susceptible crops at considerable distance by vapor given off after application.

Very truly yours,

County Agricultural Agent

Prepared by:

R. S. Douglass
Forest Management
Extension Specialist

R. P. Upchurch
Associate Professor,
Field Crops

Exhibit C

TRI-COUNTY FOREST MANAGEMENT DEMONSTRATION

Howard Butler Forest Property

Chatham County

November 1, 1961

Cooperating Sponsors:

General Creosoting Company
Halifax Paper Company
International Paper Company
North Carolina Agricultural
Extension Service

Program

10:00	Welcoming remarks and introduction of guests
	Importance of forestry in Chatham County J. B. Snipes, Chatham County Agricultural Agent
10:05	Past treatment of property and purpose of ownership Howard Butler, owner
10:15	Planting pine on cutover hardwood upland Walter Keller, North Carolina State College
10:40	Final thinning operation. Protection measures. F. E. Whitfield, North Carolina State College H. J. Andersen, Halifax Paper Company
11:30	Final harvest and sales procedure John Gray, North Carolina State College Howard Willett, General Creosoting Company
12:00	Dinner in the woods (Courtesy of Halifax Paper Company)
12:40	Sources of management assistance to landowners H. J. Andersen, Halifax Paper Company
1:00	Pole and pulpwood combination thinning and sale J. P. Harper, International Paper Company Will Tillman, General Creosoting Company
1:40	Thinning young pine stands Wallace Cawthorne, Halifax Paper Company
2:00	Summary John Gray, North Carolina State College
2:10	Adjourn

Stop #1 - Upland Hardwood Conversion

Area in demonstration plot ----- .4 acre

(All data from this point on is converted to and given on a per acre basis.)

Information

1/2 gallon 2-4-5T required per 100" D.B.H. treated
Cost of 2-4-5T figured at 50¢ per gallon (1-to-25 mixture)
1/2 man-hour labor required per 100" D.B.H. treated
Cost of labor figured at $1.25 per hour

Cost of Chemically Treating and Hand Planting This Acre

2,850 inches of D.B.H. to be treated would require:

14 1/4 man-hours @ $1.25 per hour ----------	$17.81
14 1/4 gallons of 2-4-5T @ 50¢ per gallon ---	7.13
Total cost of chemical treatment -	$24.94
Cost of hand planting (including seedlings) --	20.00
Total conversion cost ----------	$45.00

Expected Returns from 20-Year - 40-Year Rotations
(Based on Site Index 90 for loblolly pine)

20-Year Rotation

Volume Yield		Value	Present worth of $185.50 figured at several rates of compound interest	
Pulpwood --- 15.5 cords	@ $5/cord	$ 77.50	4% C.I. --------	$85
Sawtimber -- 3.6 MBF	@ $30/MBF	108.00	6% C.I. --------	58
	Total	$185.00	8% C.I. --------	40

40-Year Rotation

Volume Yield		Value	Present worth of $704 figured at several rates of compound interest	
Pulpwood --- 2.8 cords	@ $5/cord	$ 14.00	4% C.I. --------	$147
Sawtimber -- 2.3 MBF	@ $30/MBF	690.00	6% C.I. --------	67
	Total	$704.00	8% C.I. --------	32

Stop #2 - Final Thinning

I. Kind of timber - Loblolly and shortleaf pine

II. Age - 42 years

III. Total height of best trees - 82 feet. This height growth indicates that this land is above average in quality for growing pines under Piedmont conditions.

IV. Past history - This is a volunteer stand which seeded in naturally on this abandoned field in 1919 and 1920. It was never cut through until this year.

The 1 acre enclosed by string was thinned for pulpwood in 1961.

V. Timber volume and value at time of 1961 harvest - The following standing-timber prices were assumed in placing a value on this acre:

Pine and poplar sawtimber:
$30 per thousand board feet as estimated by International 1/4 inch log rule

Pine pulpwood:
Cut from standing trees in pulpwood thinning - $5.00 per standard cord of 128 cubic feet
Cut from sawtimber and pole tops - $2.00 per cord

Pine poles:
60% of price of peeled poles loaded on trucks, September 11, 1961 price list of General Creosoting Company

A. Volume and value per acre based on sawtimber cut to 10-inch-stump diameter. Smaller trees and tops cut into pulpwood.

13,400 board feet of sawtimber	$402.00
17.6 cords pulp from standing trees	88.00
6.0 cords pulp from tops	12.00
Total value per acre	$502.00

B. Volume and value per acre selling all trees suitable for poles as poles. Remaining trees above 10 inches stump diameter sold for sawtimber. Remaining trees below 10 inches stump diameter plus tops from pole and sawtimber trees sold for pulpwood.

105 poles	$371.91
1,720 board feet of sawtimber	51.60
17.6 cords pulp from standing trees	88.00
6.0 cords pulp from tops	12.00
Total value per acre	$523.51

C. Volume and value per acre selling trees for poles only when pole price is higher than sawtimber price. Remaining trees above 10 inches stump diameter sold for sawtimber. Remaining trees below 10 inches stump diameter plus tops from pole and sawtimber trees sold for pulpwood.

64 poles	$272.58
6,572 board feet of sawtimber	197.16
17.6 cords pulp from standing trees	88.00
6.0 cords pulp from tops	12.00
Total value per acre	$569.74

VI. The 1961 thinning - The poorly formed, slowest-growing trees were marked and sold on the stump for pulpwood last March.

The harvest and income from this improvement operation:

16.7 cords pulpwood	$ 83.50

125 of the best-formed, best-growing trees were reserved for growth and future sale. Spacing was improved.

VII. Value of the reserved trees in 1971 based on 1961 standing-timber prices - Based on borings made in 7 representative reserved trees.

The following volumes and values were estimated by the year 1971:

A. Based on sawtimber and pulpwood only

19,600 board feet of sawtimber	$588.00
8.6 cords of pulp from tops	$ 17.20
Value per acre, 1971	$605.20
Value in 1961 of reserved trees	418.50
10-year increase per acre	$188.70
Increase per year per acre	$ 18.87
Percent increase per year on present timber value	4.5%

B. Based on estimated pole value plus pulpwood from tops in 1971

124 poles	$909.94
8.6 cords pulp from tops	17.20
Value per acre in 1971	$927.14
Value of reserved trees in 1961	$440.00
10-year increase per acre	$487.14
Increase per year per acre	$ 48.71
Percent increase per year on present timber value	11%

Stop #3 - Final Harvest and Sales Procedure

I. If the owner decides to cash in all of the timber under conditions represented by this 42-year-old stand, he should take two things into consideration.

   A. How to sell the timber so as to realize the most income from the existing crop and leave the area and improvements on the property in the best possible condition for future operations

   B. How to provide for a second crop of pine.

II. Suggested management procedure

   A. Wait until fall of 1963 or 1964 for cone-production response to thinning.

   B. Disk or burn prior to seedfall in heavy-cone-production year.

   C. Following seedfall, mark and sell all trees suitable for poles where pole values exceed sawtimber values. Sell pulpwood from pole laps and standing trees too small for sawtimber.

   D. Sell remaining trees for sawtimber when newly established pine crop is one growing-season old if there is an adequate catch of seedlings. Sell pulpwood from sawtimber laps.

   E. If newly established crop is not adequate, wait for signs of heavy cone production; then disk or reburn ahead of it.

III. Sales procedure (Discussion leader will outline, using timber sales procedure brochure.)

   A. Preparing for pole sale

   B. Selling tops for pulpwood

   C. Preparing for sawtimber sale

   D. Selling standing trees for pulpwood

Stop #4 - Pole and Pulpwood Combination Thinning

I. Kind of timber - Loblolly pine

II. Age - 37 years

III. Total height of best trees - 83 feet. This height growth is well above average due to the fact that part of the area is bottomland.

IV. Past history - This is a volunteer stand which seeded in naturally in 1924 and 1925. It has never been cut.

V. Timber volume and value at time of 1961 harvest based on standing-timber prices as follows:

Pine sawtimber:
$30.00 per thousand board feet as estimated by International 1/4-inch log rule

Pine pulpwood:
Cut from standing trees in pulpwood thinning - $5.00 per standard cord of 128 cubic feet
Cut from sawtimber and pole tops - $2.00 per cord

Pine poles:
60% of price of peeled poles loaded on trucks if clearcut. September 11, 1961 price list of General Creosoting Company.

A. Value per acre if clearcut all trees above 10 inches stump diameter for sawtimber. Clearcut all trees below 10 inches stump diameter for pulpwood. Cut pulpwood from tops of sawtimber trees..

21,000 board feet of sawtimber ----------	$630.00
10.8 cords pulp from standing trees -----	54.00
11 cords pulp from sawtimber tops -------	22.00
Value per acre, 1961 ----------	$706.00

B. Value if clearcut all trees suitable for poles and sell for poles. Clearcut remaining trees above 10 inches stump diameter and sell for sawtimber. Clearcut all smaller trees for pulp. Cut pulp from pole and sawtimber tops.

225 poles ----------	$444.60
5,700 board feet of sawtimber ----------	171.00
10.8 cords pulp from standing trees -----	54.00
11 cords pulp from pole and sawtimber tops ----------	22.00
Value per acre, 1961 ----------	$691.60

VI. The 1961 thinning

A. The marked area on the left - This shows the condition of this timber before cutting. Notice the large number of dead trees which have been crowded out.

Trees to be cut are painted.

Pulpwood trees have yellow paint marks only.

Pole trees have a red paint mark at eye level and a yellow paint mark at the base.

B. The cut area on the right - This 1/4 acre was marked like the first one and then cut into poles. Pulpwood was cut from pole tops and marked trees not suitable for poles.

The harvest on this 1/4 acre was as follows:

23 poles ----------	$ 20.35
2.7 cords of pulpwood from standing trees ----------	13.50
1.1 cords of pulpwood from pole tops -----	5.50
Total thinned harvest value per 1/4 acre -	$ 39.35
Total thinned harvest value per acre -----	$157.40

50 of the best trees on the 1/4 acre were reserved to grow for future income. This amounts to 200 trees per acre.

If all marked trees had been cut into pulpwood only, the volume and value of the thinned harvest per acre would have been as follows:

23.1 cords of pulpwood from standing trees - $115.50

Thus there is a gain of $41.90 per acre in selling poles and pulpwood in this thinning compared to selling all marked trees for pulpwood only.

Stop #5 - First Thinning

I. Kind of timber - Loblolly and shortleaf pine

II. Age - 23 years

III. Total height - Best trees 50 feet

IV. Timber volume and value at present (1961). The following standing-timber prices were assumed in placing a value on this stand of timber:

Poles - 50% of price of peeled poles on trucks (price list of General Creosoting Company, September 11, 1961)

Pulpwood - Clearcut standing trees $5.00/cord

A. Volume and value per acre at the time of harvest based on clear-cutting for pulpwood now.

This stand had 1,068 pine trees per acre with an average diameter of 5 inches.

32.5 cords pulpwood	$162.50

B. Volume and value per acre at the time of harvest based on clear-cutting for pulpwood and poles now.

96 poles	$ 64.50
24.6 cords pulpwood	123.50
	$188.00

C. Volume and value of pulpwood removed in this thinning

7.8 cords cut (@ $4.00)	$ 31.20

VI. Volume and value of reserved trees in 1971 based on 1961 standing-timber prices. Based on sawtimber and pulpwood only.

29.6 cords @ $5.00	$148.00
1,110 board feet (Scribner) @ $30/M.B.F. -	33.30
Value per acre, 1971	$181.30
Value in 1961 of reserved trees	123.50
10-year increase per acre	$ 57.80
Increase per acre per year	$ 5.78
Percent increase per year on present timber value	4.7%

Exhibit D

A. T. Davison, Pres. Durham, N. C.
Walter Tennant, Vice-Pres. Crossnore, N. C.
Herman Dellinger, Sec.-Treas. Crossnore, N. C.

NORTH CAROLINA CHRISTMAS TREE GROWERS ASSOCIATION
Newsletter #3
November, 1961

Leonard Hampton, Editor
Box 7317, Asheville, N. C.

Seedling Situation

According to reports from the North Carolina tree-seedling nurseries, the following species are available this year: (as of October 31)

1.	Fraser fir	794,000	2 + 1
2.	Fraser fir	1,499,000	2 + 0
3.	Scotch pine	700,000	1 + 0
4.	Scotch pine	---	2 + 0
5.	Norway spruce	---	2 + 0
6.	Douglas fir	0	2 + 0
7.	White pine	5,331,000	2 + 0
8.	White pine	---	5 + 0

The above-listed species with a blank under the available number for distribution are very limited in quantity; so I suggest an early order for those desiring these species.

For information on where you can order seedlings not being grown by the state, contact Mr. Herman Dellinger, Crossnore, N. C., or your County Agricultural Agent.

Note from the Editor

As most of you already know, John Gilliam is now attending the University of Tennessee, working on the graduate level in the field of Horticulture. His work will keep him at the University until September of 1962. John was previously assigned to the Boone area as an Extension specialist to work primarily with Christmas tree producers and marketing in that area, as well as serve as your editor of this Newsletter.

John is expected to continue his work with the Extension Service on his return next fall as a state-wide specialist in Christmas tree production and marketing.

With your permission, I will be pinch-hitting for John as editor of this newsletter while he is away in school.

If you have any suggestion for the improvement of this newsletter, or from your experience have ideas pertaining to the growing of Christmas trees which you would like to pass on to our readers, please let me know. Address your comments and suggestions to Leonard A. Hampton, Forest Management Extension Specialist, Box 7317, Asheville, N. C.

Protect Your Christmas Tree Plantation

Surround the plantation with a plowed strip for fire lanes where you do not have natural boundaries such as streams, etc. For larger plantations, divide into blocks and plow fire lanes between blocks.

Livestock will browse all species of evergreens, causing severe damage. Complete protection from all types of livestock is necessary.

Insects and Diseases

The special report on insects and diseases that was planned for this newletter has been delayed until the next edition in January.

Fraser Fir Booth Wins First Place at State Fair

Avery County won first place in the 4-H Division at State Fair this year. The theme of the booth was "4-H'ers Grow Fraser Fir for Christmas Trees."

The booth was set up showing three different sections. The first section showed a plantation of Fraser fir seedlings with a brief explanation of planting requirements. The next section, elevated slightly above the first section, showed the management phase of production. One sheared and one unsheared Fraser fir trees were displayed to show the quality obtained from shearing. A bag of simulated chemical and fertilizer was displayed to denote an expected use for weed control and fertilization. Two Fraser firs, one balled and burlapped, and the other cut, were displayed with U. S. premium grade tags attached to each. A brief explanation outlined the main costs involved in management. The last section displayed a 6' Fraser fir, well-decorated with flashing lights and other ornaments, that rotated slowly on a revolving stand. This section displayed the expected net return per acre for growing Fraser fir. This display was well accpeted and admired by many people who visited the booth.

Secretary's Report by Herman Dellinger

The fifteenth state association of the National Christmas Tree Growers' Association, Inc., has approved a special contribution of $1.00 per member to the Consumer Public Relations Program, and these contributions are now payable. Please send your $1.00 to the secretary at once.

At a recent board meeting, held in Newland, the board set in motion plans for each member to help in this program. Reports from the National Association show that it has done a good job of getting under way in the few short months since its inception; and should have some good effects upon the marketing of "fresh, green" trees in the coming season.

The annual winter meeting will be held November 17 at 7:00 P. M., Newland Courthouse, Newland, N. C. The election of officers for the coming year, and other important business concerning the future of the industry will be taken up at this meeting.

All members are urged to attend.

Sprays Prevent Needle Drop in Norway Spruce*

Spruce is considered a highly desirable Christmas tree by a large number of people. Normally, it is well-shaped, good-colored and short-needled. The major objection to the spruce is its inability to hold its needles, unlike the Fraser fir. Usually, within a few days in a hot, dry room it sheds its needles.

An experiment was initiated at the Ohio Experiment Station to observe the effects of clear and pigmented latex-based sprays on the prevention of needle drop in Norway spruce.

Fifty trees from three to five feet tall were sprayed on October 10, 1960, in a plantation in Ohio. The trees were sprayed uniformly with a portable unit containing an agitator. About one quart of material was used per tree.

The trees were treated with "clear spray," "tinsel white," "tinsel blue," "tinsel pink," "greenzit," and "winterlawn." These spray concentrates were used undiluted at 1:1 proportions with water, except greenzit and winterlawn. which were used at 1:40 ratio with water.** After one week in the field two trees of each treatment were cut and placed in a heated room. The temperature ranged from 60° F. at night to 74° F. during the day. The relative humidity ranged from 48 percent at night to 34 percent during the day.

Four days after cutting about 10% of the needles had dropped from the unsprayed trees. This increased to 75% by the seventh day. After eleven days these trees were completely denuded. The greenzit- and winterlawn-sprayed trees lost 15% of their needles by eleven days and 100% at fourteen days after cutting. The trees sprayed with the undiluted or 1:1 mixture of clear or pigmented latex lost relatively few needles in the two-week period.

Clear or pigmented latex-based sprays at 1:0 or 1:1 ratios (with water) practically reduce needle drop to zero when sprayed on Norway spruces prior to cutting. The cause of the needle retention in these experiments appears to be two-fold. First, the moisture content of the sprayed needles remains double that of unsprayed. Second, the latex appears to form a continuous film over the needle and stem, gluing the needle in place.***

*Taken from Ohio Farm and Home Research issue of November-December, 1960.
**Material was provided by W. A. Cleary Corp., New Brunswick, N. J., and Winterlawn Sales Corp., Atlanta, Ga.
***This information is not intended to discriminate against any commercial product.

The following excerpts are quoted directly from the Christmas Tree Report, issued by the New York State Department of Agriculture and Markets, dated November 1, 1961:

"Information from Various Areas

"New York State: Many of the large early sales have been made, but even these are two to three weeks behind last year. The regular buying at present is strictly along quality lines with premium grade in excellent demand and a large majority have been sold. Buyer resistance to this grade is negligible and prices are holding fairly firm. The U. S. 1 grade is receiving fairly good buyer inquiry, but there is resistance on the part of buyers to consummate sales; prices have been holding fairly steady for sales made. In general, the volume of buying is two to three weeks behind last year. Buyers are very quality conscious! This is probably due to the fact that most of last year's unsold trees were those of poor quality, and buyers don't want to make the same error again.

"Pennsylvania: Information from reliable sources is that the season is two to three weeks behind in all areas of the state. Large producers are selling quantities, but to a slower market. Some smaller producers have made a few sales. Here, too, they believe weather conditions are a factor. Douglas fir is selling well, but Scotch pine under No. 1 grade is extremely slow.

"Michigan: About a quarter million Scotch pine have been sold for this season. Bulk of the sales are to retailers. Most of the sales were out of state; also, the bulk of the sales were U. S. No. 1 grade. F.O.B. Scotch pine prices to retailers run generally over $1.25 on stump, and over $1.50 cut and tied."

Competition of Hardwoods and Brush in or Around the Christmas Tree Plantation

In order to produce well-formed Christmas trees, the removal of competing hardwoods and brush is sometimes necessary. The attached recommendations usually produce satisfactory results.

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, NORTH CAROLINA COUNTIES AND UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS STATE OF NORTH CAROLINA

Exhibit E
EXTENSION SERVICE

Farm Forestry Facts

Forestry Extension Department N. C. State College, Raleigh, N. C. April, 1960

SHEARING AND PRUNING WHITE PINE AND RED CEDAR FOR CHRISTMAS TREES

Top quality Christmas trees depend upon a uniform, tapered shape, compactness and symmetry. To obtain these qualities a good shearing and pruning program is necessary throughout the growing life of a tree.

CHRISTMAS TREE CHARACTERISTICS -

A tree must have certain characteristics to be classified as a desirable Christmas tree species. Certain of these characteristics such as (1) Density, (2) Taper, (3) Balance and (4) Deformities can be controlled by shearing and pruning.

If no shearing and pruning is done a plantation of White Pine and/or Red Cedar would yield only approximately 20 to 30 per cent good quality Christmas trees. By following a well planned shearing and pruning program the yield can be increased from 60 to 80 per cent good quality trees. It can therefore mean the difference between a profit or loss to the Christmas tree grower.

WHAT IS SHEARING AND PRUNING -

The term shearing is generally applied to shaping or cutting back current years growth on terminal and lateral limbs. Pruning refers to the removal of injured or deformed parts, or a double leader which will not be replaced by new growth.

Shearing and pruning will encourage new growth buds, more compact, development, improve the symmetry and taper, and decrease deformities.

WHEN TO START AND TIME OF YEAR -

Both White Pine and Red Cedar should be sheared and pruned when they reach 2 to 2 1/2 feet in height and/or show more than 10 to 12 inches height growth in one year.

The time of year for shearing is very important for both White Pine and Red Cedar. Shearing too early may cause too heavy bud set and irregular growth. Too late shearing may cause small buds, too few buds, and many dead stems. Use the following table as a guide to approximate shearing dates.

(MORE)

2. Start shearing the trees when they reach 2 to 2 1/2 feet in height and shear each year thereafter until the year preceeding marketing.

3. Prune out dead and deformed branches and excessive lateral growth.

4. Shear at the right time of year. Use time-table for shearing date.

5. For additional information on shearing and pruning Christmas trees contact your County Agricultural Extension Agent.

Very truly yours,

County Agricultural Agent

Prepared by:
John H. Gilliam
Forestry Management Extension Specialist

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, NORTH CAROLINA COUNTIES AND UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS STATE OF NORTH CAROLINA

Exhibit F

EXTENSION SERVICE

Farm Forestry Facts

Forestry Extension Department N. C. State College, Raleigh, N. C. December, 1961

EVERGREEN TREES SUITABLE FOR CHRISTMAS TREE PRODUCTION IN NORTH CAROLINA

There are many evergreen trees that can be grown for Christmas trees in North Carolina. Your choice will depend primarily on the desirable characteristcs the trees possess and their adaptability to your local climatic conditions.

There are several characteristics that determine a good Christmas tree:

1. Foliage - Dark-green to blue-green is best. Twigs should be stiff enough to hold ornaments, yet be soft enough to ship without breaking.
2. Needle retention - They should have the ability to hold needles well at room temperature. Trees should be able to hold needles from three to four weeks after cutting to insure a fresh, safe tree during the Christmas holidays.
3. Fragrance - Trees should have a pleasing odor.
4. Insect and disease resistance - Some species seem to have a greater number of natural enemies than others; yet none are completely free from insects.

Table I - Quality Characteristics of Christmas Tree Species

Species	Fragrance	Color	Stiffness of Twig	Shipping Qualities	Needle Retention	Freedom from Pest
Red cedar	Excellent	Poor to good	Fair	Poor	Poor	Poor
Arizona cypress	Fair	Good	Fair	Poor	Poor	Poor
Scotch pine	Good	Poor to good	Excellent	Good	Excellent	Poor
White pine	Good	Good	Good	Good	Good	Fair
Norway spruce	Good	Good	Good	Fair	Poor	Fair
White spruce	Good	Good	Good	Fair	Poor	Fair
Fraser fir	Excellent	Excellent	Excellent	Excellent	Excellent	Very good
Douglas fir	Very good	Excellent	Good	Excellent	Very good	Very good

All species listed in Table I can be grown successfully in North Carolina but are restricted to certain geographic locations with regard to climatic conditions and altitude.

(MORE)

Table II - Species Adapted to North Carolina Conditions by Geographic Location

Area	Species
Coastal Plain	Red cedar (Juniperus virginiana)
	Arizona cypress (Cupressus arizonica)
	Scotch pine (Pinus sylvestris)
Piedmont	Red cedar
	Arizona cypress
	Scotch pine
	White pine (Pinus strobus))Upper Piedmont
	Norway spruce (Picea abies)) only
Mountain	White pine
	Norway spruce
	White spruce (Picea glauca)
	Blue spruce (Picea pungens)
	Douglas fir (Pseudotsuga menziesii)
	Fraser fir (Abies fraseri)
	White fir (Abies concolor)

For additional information on Christmas tree varieties to plant in North Carolina contact your county agricultural agent.

Very truly yours,

County Agricultural Agent

Prepared by:
John H. Gilliam
Forest Management Extension Specialist

Exhibit G

BOTTOMLAND HARDWOOD MANAGEMENT PROGRAM - INITIAL PHASES

Extension Forestry Department
September 8, 1961

I. As of this date, Edward M. Jones, Forest Management Extension Specialist, is assigned primary responsibility for the Extension phase of a program to boost (1) land-owner income, (2) production and supply of raw-hardwood products to industry from lands suitable for the production of commercial hardwood products throughout North Carolina.

Initially, he will concentrate his efforts in counties containing large areas in river-bottom and swamp-hardwood forest types in the Roanoke River valley.

In developing this program, he may solicit the cooperation of other Extension Forestry specialists whose area assignments include holdings of this type, or whose subject-matter assignments and background are related to this program phase.

Mr. Jones will also serve as general forest management program specialist in the North Coastal Forestry Extension area.

II. Mr. Jones will be breaking new ground in this particular program. Reliable subject matter based on well-designed research studies is generally not available on this phase of forestry. Commercial efforts at managing such lands on a basis other than repeated exploitation are just getting underway on a few properties in the Mississippi Delta and elsewhere.

Accordingly, one of Mr. Jones' major problems will be to help develop a subject-matter base of information for use by landowners and land-owning industries in North Carolina.

Initial steps towards dealing with this problem will include the following:

A. Collecting and abstracting information from all existing research publications on bottomland hardwood production, harvesting and marketing which relate to North Carolina conditions.

B. Inventorying and preparing information on major existing markets in North Carolina for raw-timber products from coastal bottomlands. Preparation of market-trend information in cooperation with Wood Products Extension staff and others.

C. Initial and follow-up contacts with research workers at centers currently engaged in bottomland hardwood research, in particular the Santee Research Center of the Southeastern Forest Experiment Station and the Delta Hardwood Research Center of the Southern Forest Experiment Station. Mr. Jones, if he judges it advisable, will volunteer to serve as a member of the advisory committees at each of these research centers.

D. Publishing an Extension circular on a phase of sweet gum-water oak management based on Mr. Jones' thesis research at Louisiana Polytechnic Institute. Preparing a write up on this material for publication in the "Journal of Forestry."

E. Preparing individual Extension circulars based on worthwhile case histories of commercial experience in bottomland hardwood management.

F. Developing support for a bottomland hardwood research program at the School of Forestry, North Carolina State College.

G. Preparing written statements on major initial problem areas for research attention based on field contacts, experience and the opinions of leaders in this field.

III. The second major task is to develop a description of clientele and potential leaders in bottomland hardwood development, make them aware of existing opportunities, knowledge and efforts in this field and convince them that North Carolina State College can and will be, with their support, a source of information, assistance and leadership.

In developing a description of clientele, Mr. Jones will concentrate first on contacting and listing the larger industrial and individual bottomland forest owners. He will use as a starting point a list of individuals and companies with 5,000 acres or more of forest land located in counties adjoining the Roanoke River where there is a possibility that a considerable portion of such holdings are in river-bottom or swamp-hardwood types.

He will seek the assistance of members of the Wood Products Extension staff, representatives of wood-using industries, consulting foresters, and others in correcting and adding to this list. He will follow up by personally visiting those who are making, or have made, an attempt to develop bottomland hardwood holdings; and, where he feels their experience would be valuable to others, with their permission he will write up individual case-history Extension circulars on their experience.

Other initial steps in this phase of the program will include:

A. Preparing a reasonably accurate mailing list of individuals and firms who have a major interest in bottomland forest development.

B. Personally contacting those who are attempting to develop this type of land and who give promise of being leaders in this particular phase of forestry.

C. Beginning to feed subject-matter or case-history information to those on the mailing list.

D. Planning and holding an initial in-state field trip visiting active operations in bottomland hardwood management, harvesting, marketing, and the like.

E. Planning an out-of-state tour, with attendance on an individual-invitation basis to leaders, to visit commercial and research operations of particular interest to this group.

F. Sounding out key persons in this enterprise to develop support and ideas for a major research program at North Carolina State College.

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, NORTH CAROLINA COUNTIES AND UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS STATE OF NORTH CAROLINA

Exhibit H
EXTENSION SERVICE

Farm Forestry Facts

Forestry Extension Department N. C. State College, Raleigh, N. C. October, 1961

White Pine Weevil

The white pine weevils continue to increase in western North Carolina, causing considerable injury to white pine. These weevils also attack Scotch pine, the spruces and Douglas fir, making them of special interest to Christmas-tree growers.

The attack of these insects kills the leaders of the trees and is probably the most serious pest of white pine.

The adult weevils hibernate in the litter during the winter months. During the warm days of early spring they emerge from hibernation and start feeding on the tender bark of the branches. When daytime temperatures reach 75°F. or above, the female deposits her eggs in small punctures she makes in the leader. When this occurs, drops of resin appear.

The eggs hatch in about a week. The larvae tunnel under the bark and migrate downward as they develop. As much as three previous seasons' growth may be killed by the girdling effect. Mature larvae bore into the wood of the shoot and rest for about ten days (pupate). In July and August the adults emerge and feed until they hibernate for the winter. There is only one generation each year.

Fall and Winter Spraying Solutions:

From the middle of September through December spray the following solution:
Lindane 20% emulsifiable concentrate - 12.8 fl. oz.
Extender - Aroclor + zylene (#5460) - 3.4 fl. oz.
Water to make two gallons of emulsion

Spring Spraying Solution:

During March and April spray the following solution:
Lindance 20% emulsifiable concentrate - 6.4 fl. oz.
Extender - Aroclor + sylene (#5460) - 1.8 fl. oz.
Water to make two gallons of emulsion

DDT 25% emulisifiable concentrate - 20.4 fl. oz.
Water to make two gallons

Usually the butt log produces two-thirds of the board-foot volume and three-fourths of the lumber value in the tree. Therefore, it will be necessary to protect the trees until they are 18 feet in height. Three to five treatments should provide enough protection for them to obtain this height.

Selective Spraying

Spray only good trees (crop trees). In a plantation 5 feet to 8 feet in height 450 trees can be sprayed per gallon, 650 trees can be sprayed per hour.

Remove and burn weeviled leaders of untreated trees in July.

Very truly yours,

County Agricultural Agent

Prepared by:

F. E. Whitfield
Forest Management
Extension Specialist

Exhibit I

Extension Forestry
KILGORE HALL

AGRICULTURAL EXTENSION SERVICE
COOPERATIVE EXTENSION WORK IN AGRICULTURE & HOME ECONOMICS
NORTH CAROLINA STATE COLLEGE · RALEIGH, NORTH CAROLINA

July 21, 1961

To: Certain County Agricultural Agents
From: Fred E. Whitfield

There has been a widespread blighting of white pines all over the state recently by a disease called Emergence Tipburn. The distal portion of the current year's needles turn brown, causing anxiety among tree owners. These brown tips will turn gray and later drop. This disease is not likely to kill the tree, and no treatment is recommended. Next year's needles should be normal, assuming normal weather conditions.

The quotation below is from a paper delivered by Dr. George H. Hepting and Dr. Charles R. Berry, of the Southeastern Forest Experiment Station in Asheville:

"Emergence tipburn

"This is probably the same as the common 'mystery' disease of the past, mentioned earlier, the cause of which has defied so many researchers. During the growing season, the distal parts of the needles become reddish-brown, then brown, and later grayish, after which the dead tips usually break off. Only the current year's needles are affected. A given tree is generally quite uniformly affected, and its needles may be dead just a short way back from the tips, or for most of their length. The affected needles are not shed prematurely. There is a marked tendency for the same trees to show this trouble during 'blight' years, indicating genetic susceptibility, and for neighboring trees to remain consistently free from it. The line of demarcation between the dead and living part of the needle is very sharp, and usually is a yellow-green band. During certain years, emergence tipburn may occur over large areas throughout the East, and in other years it is hard to find. It may recur perennially, and dominant trees have been known to die of it, but it is often not damaging in the southern Appalachians, and growth becomes normal between 'blight' years. Dead root ends are common with this condition, and it is likely that the degree of recovery between attacks depends upon extent of root dying during attacks. If one can follow this condition from its onset during the growing season on specific trees, its identity can usually be established.

"LINZON (1960) gives a good up-to-date account of this blight in Canada, and regards it as a physiogenic distrubance."

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, NORTH CAROLINA COUNTIES AND UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS STATE OF NORTH CAROLINA

Exhibit J

EXTENSION SERVICE

Farm Forestry Facts

Forestry Extension Department N. C. State College, Raleigh, N. C. December, 1960

Eastern Redcedar

Landowners of North Carolina have sought after redcedar (Juniperus virginiana L.) since early colonial days. Large quantities of wood from this tree have been, and are still being, consumed for paneling, millwork, woodenware, poles, posts and novelties. The fragrance of redcedar and its reputation for keeping moths away, combined with its striking color and excellent finishing properties, make it very popular for furniture, closet lining and chests.

Homeowners use redcedar for Christmas trees, as well as for ornamental plantings.

Redcedar grows naturally in all kinds of places (ridges, slopes, and flat land), but it does best on a loamy limestone soil.

Farmers are showing new interest in this tree because of its desirability as a Christmas tree. However, there are disadvantages in trying to grow redcedar in plantings because of diseases.

Christmas tree growers are finding a new blight that causes the lower branches to die. The disease keeps getting higher in the tree until only the tips of the branches are alive. This needle blight is called Exosporium (Exosporium glomerulosum (Sacc.) Hohn.)

A twig blight that makes redcedar unfit for a Christmas tree is called Phomopsis (Phomopsis juniperovora Hahn). This disease starts at the tip of a limb and moves down to kill the whole branch. Later it may kill the entire tree. In general, this disease is more severe on young trees, where it may completely kill all seedlings growing for Christmas trees.

Cedar-apple rust is a well-known disease that grows on redcedar and apple trees. Very little harm comes to redcedar, but the rust badly damages apples. The best control is to keep redcedar trees away from apple trees.

(OVER)

A root disease called Fomes (Fomes annosus (Fr.) Cooke) sometimes destroys the roots and kills redcedar. Shaded trees seem to be killed more easily than those in the open.

You may now ask - What can be done to control these diseases?

Mr. Howard Garris, Extension Plant Pathologist in a preliminary test, controlled Exosporium by spraying 9 times with Ortho Phaltan at 10-day intervals and/or after each heavy rain. Such a spray program is too expensive for redcedar Christmas trees. It may be that fewer applications will work and that other chemicals will effectively control Exosporium. More research is needed on the life history of the cedar fungus and control before definite recommendations can be made.

Phomopsis can also be controlled by spraying with fungicides, but what chemicals are best and how many applications are needed are not known at present.

There is no control for root diseases.

Very truly yours,

County Agricultural Agent

Prepared by:

Fred E. Whitfield
Forest Management Extension Specialist

Exhibit K

NORTH CAROLINA'S GREEN FACTORIES

by
John Gray, Extension Forester
North Carolina State College

What's the biggest living thing on earth - an elephant, the Kodiak bear of Alaska, the African lion?

Guess again. It's a plant which started growing 4,000 years ago from a seed so small that it takes 91,000 of them to make a pound. This plant is the General Sherman Bigtree or Giant Sequoia in Sequoia National Park near Bakersfield, California. It stands 272 feet, and is 32 feet across at the base. It weighs more than 800 tons and contains enough lumber to build 57 houses, with 1,000 square feet of floor space apiece.

Plant is the right word to use in describing the sequoias, redwoods, Douglas firs, southern yellow pines and 1170 other kinds of forest trees found in the United States. They are the highest form of life in the plant kingdom, just as man is the highest form of life in the animal kingdom.

They are also plants in the manufacturing sense---living factories. An expert once tried to list all of the ways and forms in which human beings use wood. After recording 4,500 uses, he quit, admitting that his list was still incomplete.

How do trees serve as factories? What do they use for raw materials? What products do they make for us?

All trees use the same basic raw materials for growth---water and minerals from the soil, carbon dioxide and oxygen from the air. All use energy from the sun falling on leaves (or needles) and bark as a source of power to carry on the process of photosynthesis. Through this process, carbon dioxide and water are turned into sugars and oxygen.

All trees produce wood and bark fiber from these sugars, plus such byproducts as starch, fats, resins, tannins and other sugars. In the growing tree, this whole mass is saturated with water. Young leaves and root tips contain as much as 90 per cent water, tree trunks as much as 50 per cent.

Let's ignore the byproducts, important as some of these are, and take a look at the basic product of this natural factory---wood fiber. How much does a crop of trees produce and what do we get from it to use in our daily living?

Take a look at the South's most important timber tree---the loblolly pine of the Coastal Plain and Piedmont.

Visualize an acre of well-stocked loblolly pine on average North Carolina Coastal Plain land. Such land will grow loblollies 65 feet tall in 30 years. Imagine a crop that seeded in naturally, for although we are now planting millions of pines a year, most of the present crop is wild in origin.

(Over)

Let's assume that the owner of this acre has held the crop without doing any cutting for thirty years. (This is not necessarily the best procedure to follow, but we want to keep our example simple.)

Under these circumstances, this one-acre pine crop would manufacture roughly three tons of usable wood and bark each year. When we separate the bark from the wood at a pulp mill or sawmill, we get about 5,000 pounds of wood and 1,000 pounds of bark. At present, the bark has very little value. Even so, this amount of dry bark would heat the average home for three winter days in our climate.

What useful products can we make from this one acre's yearly growth of 5,000 pounds of wood? If we grind all of it into chips and put it through a pulp mill, this acre's yearly growth can be made into:

15,000 large grocery bags or
7,900 2-quart milk bottle cartons or
1,400 copies of a 48-page newspaper or
900 viscose rayon women's dresses

Let's look at this yearly growth another way. Part of it is suitable for sawing into lumber. We can make a combination harvest and produce 300 square feet of one-inch-thick boards plus 2,500 pounds of wood for pulping.

On this basis, the yearly growth of 35 acres of loblolly pine provides enough lumber to build a six-room home with 1,000 square feet of floor space plus 262,000 grocery bags, or 137,250 2-quart milk cartons, or 24,500 newspapers, or 16,000 rayon dresses.

The average forest acre is only about half as productive as this one. But North Carolina has 19,000,000 acres in woodland and an additional 50,000 to 60,000 acres of open land being planted to pines each year. This is a green factory capable of making an almost unlimited contribution to the physical needs and prosperity of her people.