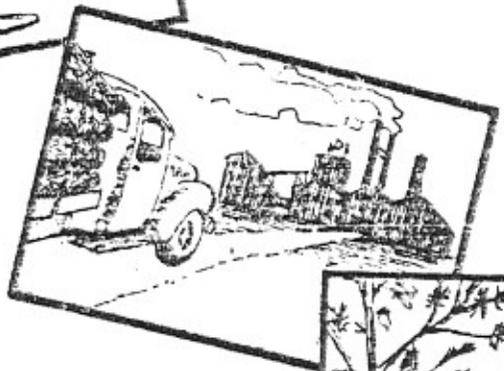
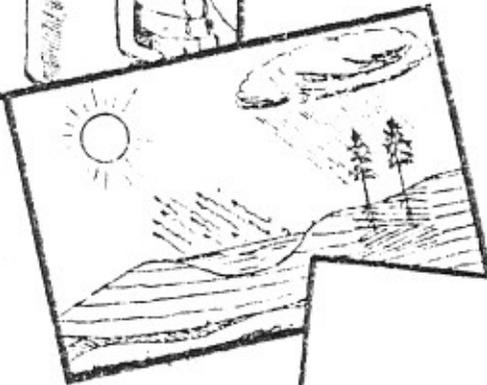
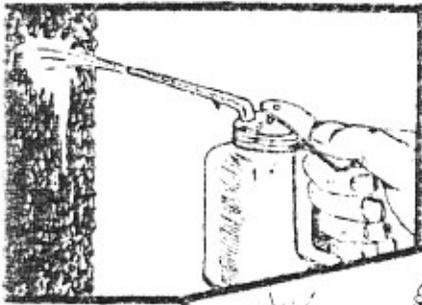


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# VIRGINIA LANDOWNERS

## TRY DIRECT SEEDING

### LOBLOLLY PINE



Virginia Division of Forestry  
Department of Conservation & Economic Development  
Charlottesville, Virginia

Virginia Landowners Try Direct Seeding Loblolly Pine  
(First Growing Season Results, 1960)

Introduction

There is considerable interest in direct seeding among Virginia landowners. However, information pertaining to results of direct seeding in Virginia is meager.

In 1960, Virginia Division of Forestry personnel working in cooperation with various Virginia Piedmont and Coastal Plain landowners helped direct seed small pilot areas so that a compendium of direct seeding results might be started. This report covers the first growing season results (1960) of these seedings.

Counties

There was at least one direct seeding in each of the following Piedmont counties: Albemarle, Bedford, Buckingham, Cumberland, Dinwiddie,<sup>1/</sup> Fluvanna, Hanover,<sup>1/</sup> and Spotsylvania.

Coastal Plain counties having one or more direct seeding included Essex, King and Queen, Lancaster, Northumberland, Richmond, Southampton, and Sussex.

Number and Size of Areas Direct Seeded

A total of 20 direct seedings will be reported on in this report. Of this total 9 were in the Piedmont and averaged approximately 3.5 acres each while the 11 in the Coastal Plain averaged approximately 2 acres each.

There were two areas of 0.5 acre each (smallest acreage included) and one of 8 acres which was the largest area seeded.

<sup>1/</sup> Listed as Piedmont because the soil type was that of a Piedmont soil.

Seed Used

Stratified loblolly pine seed was used, except as noted, in all the direct seeding areas included in this report. With one exception all loblolly pine seed used was collected in Virginia. Mr. Wilson Shafer, Albemarle County, purchased and used seed from Georgia. All seed used was treated with "sticker," Arasan 75, Endrin, and aluminum flakes for bird, insect, rodent control, etc.

One area of 2 acres located on the Cumberland State Forest was direct seeded using non-stratified seed; all other seed used was stratified for at least 30 days.

The Virginia loblolly pine seed used averaged 18,000 seeds per pound and had a germination percent of 75%.

Site Preparation

All areas seeded had site preparation in one form or another.

The most commonly used methods of site preparation or soil exposure were disking and bulldozing. However, there were two areas which had been in crop cultivation just prior to being seeded.

Soils

Both typical Piedmont and Coastal Plain soils were represented in the seedings. A complete listing of soils, by type, may be found later in the report.

Seeding Method, Rate, and Time

Seeding was accomplished using hand methods and broadcasting the seed. In all but two cases a "Cyclone" type seeder was used to distribute the seed.

The seeding rate per acre varies from 0.28 pounds per acre up to 1.25 pounds per acre. However, of the 20 direct seeding cases included in this report, 14 cases used from 0.75 to 1.00 pound of seed per acre.

The one area on the Cumberland State Forest using non-stratified seed was sown on February 22, 1960. The remainder of the seedings, using stratified seed, took place in April and May with the last seeding taking place on May 3, 1960.

#### Date Seedings Field Checked

The direct seeded areas were checked for results during December 1960 and January 1961.

#### Stocking Discussed

In the summarized tabular data which follows the terms "percent stocking" and "number of seedlings per acre" will be encountered.

Number of seedlings per acre is self-explanatory. Percent stocking may be a new term to some and an explanation of the meaning of this term might be in order. One way to understand the meaning of percent stocking is to visualize one acre divided into 1,000 equally sized squares, 6.6 feet by 6.6 feet. These little 6.6 feet by 6.6 feet squares are called mil-acres ( $1/1,000$  acre). In order for an acre to be considered fully stocked, all of the  $1/1,000$  acre squares should contain at least one well-established seedling of the desired species. Within a given acre should 630 of the mil-acre squares contain at least one seedling, the percent stocking becomes  $630/1,000$  or 63 percent. Stated differently, a percent stocking of 63 indicates that, on the average, there are at least 630 well-distributed seedlings per acre.

In any statistical sampling scheme only a portion of the entire population is ever sampled. This is usually the case in forestry also. Therefore,

in the tracts included in this report only a percentage of the total number of mil-acres contained in a given tract were "sampled". The percent stocking and number of seedlings per acre figures contained in the following tabular data were computed and based on a sample of the total mil-acre plots actually available for sampling. Where stocking conditions warranted it a minimum of 100 mil-acre plots were taken within each direct seeding area included in this report.

To those not familiar with percent stocking and number of seedlings per acre it may seem that an incongruity appears in the following tables. For example, in the Coastal Plain, the Dann tract located in Lancaster County had a percent stocking of 86.25 with 5,137 seedlings per acre whereas the Blunden tract located in Northumberland County had a percent stocking of 87.00 with 3,370 seedlings per acre. This is not a typographical error. How this seemingly incongruity occurs can probably be best explained with an example. Suppose two tracts were sampled using the mil-acre system and one mil-acre was taken within each tract in order to obtain percent stocking and number of seedlings per acre (remember, this is an example only). The one mil-acre sampled in Tract A contained 3 seedlings whereas the one mil-acre sampled in Tract B contained 5 seedlings. Both tracts A and B in the example used would have 100 percent stocking but tract A would have, on the average, 3,000 seedlings per acre whereas tract B would contain, on the average, 5,000 seedlings per acre. In this example, both tracts had the same percent stocking, yet one tract contained 2,000 seedlings more per acre than the other.

The figures appearing in the Percent Stocking and No. Seedlings Per Acre columns in the following tables indicate a probability of 2 to 1.

Summary of Direct Seeding Results

First growing season results are summarized below:

Coastal Plain

<u>Tract</u>	<u>County</u>	<u>Soil Type</u>	<u>Date Sown</u>	<u>Seeding Rate Per Acre<sup>1/</sup></u>	<u>Percent Stocking</u>	<u>No. Seedlings Per Acre</u>
Story	Southampton	Norfolk f.s.l.	4/13/60	0.39	71.00 $\pm$ 5.86	1410 $\pm$ 220
Magee	Sussex	Atlee f.s.l.	4/13/60	0.25	28.00 $\pm$ 10.67	400 $\pm$ 200
Dann <sup>1/</sup>	Lancaster	Sasafra	4/22/60	1.00	86.25 $\pm$ 4.20	5137 $\pm$ 1134
Blunden <sup>1/</sup>	Northumberland	Sasafra	4/22/60	1.00	87.00 $\pm$ 5.59	3370 $\pm$ 486
Jewell's Vo-ag.	Northumberland	Kempville	4/20/60	1.00	67.00 $\pm$ 6.84	1640 $\pm$ 358
Swain <sup>1/</sup>	Northumberland	Sasafra	4/22/60	1.00	89.00 $\pm$ 4.58	3480 $\pm$ 507
Morris	Richmond	Caroline	4/20/60	1.00	79.00 $\pm$ 6.05	2620 $\pm$ 502
Davis	Richmond	Wayside	4/20/60	1.00	48.00 $\pm$ 8.92	1160 $\pm$ 342
Gray	King & Queen	Huckabee	4/21/60	0.66	53.00 $\pm$ 7.31	1580 $\pm$ 424
Beane Est.	King & Queen	Huckabee	4/21/60	0.75	60.00 $\pm$ 5.77	1840 $\pm$ 544
McKinney	Essex	Caroline	4/22/60	0.53	92.00 $\pm$ 2.91	5340 $\pm$ 751

<sup>1/</sup> Forester F. W. Patton also was one of the participants in these direct seedings.

Piedmont

<u>Tract</u>	<u>County</u>	<u>Soil Type</u>	<i>Stratified Seed</i> <u>Date Sown</u>	<u>Seeding Rate Per Acre#</u>	<u>Percent Stocking</u>	<u>No. Seedlings Per Acre</u>
Young	Dinwiddie	Appling s.l.	4/13/60	0.28	21.00±5.25	280±92
Flippo	Hanover	Cecil loam	4/19/60	1.00	86.67±4.82	4067±547
Holland	Fluvanna	Orange	5/3/60	1.00	67.00±5.92	1760±151
Shafer	Albemarle	Cecil loam	4/11/60	0.80	46.00±3.71	2190±434
Welch	Spotsylvania	Nason-Tatum	5/2/60	1.00	54.00±9.09	1230±303
Burruss	Buckingham	Nason-Tatum	4/26/60	1.00	87.00±4.48	3140±566
Willis	Bedford	Hayesville	4/26/60	1.00	20.00±5.48	300±95
State Forest	Cumberland	Nason-Tatum	4/6/60	1.25	36.00±11.27	970±448
State Forest Non-Stratified Seed	Cumberland	Nason-Tatum	2/22/60	0.80	30.00±5.96	350±64

Future Plans

Stocking data, will be collected for direct seedings made in 1961 and 1962 and will appear in later reports. It is also planned to include some direct seeding results involving white pine seedings in the 1961 report.

Adendum

## (Direct Seeding Loblolly Pine Using a Panama Seeder)

Introduction

During February and April 1960 the Virginia Division of Forestry working in cooperation with Mr. R. S. Burruss (Appomattox and Buckingham Counties) and Mr. Arthur Flippo (Hanover County) established some Panama direct seeding areas. The results of these seedings are also included in this report.

The Panama Seeder

The Panama Seeder is just one of many seeding devices whereby a few seeds at a time can be placed in desired spots or locations.

The Sites Seeded

Three different site conditions were seeded on the Burruss tracts: 1) Abandoned field (broom sedge cover), 2) Bulldozed, and 3) Cut-over woodland (no site preparation).

The Flippo seeding site was prepared by bulldozing.

Seed Used and Dates Sown

On the Burruss tracts both non-stratified and stratified loblolly pine seed were sown. The non-stratified seed was sown on February 2, 1960 and the stratified seed sown on April 26, 1960.

Only stratified loblolly pine seed was used on the Flippo tract and it was sown on April 19, 1960.

All seed used was treated with "sticker," Arasan 75, Endrin, and aluminum flakes.

Number of Seed Dropped Per Spot

Using seed averaging 18,000 seeds per pound the Panama seeder used placed from one to seven seeds per spot. The average number of seeds per spot was between three and four.

Where necessary, mineral soil was exposed (usually by scraping away litter, etc., with foot) before the seeds were dropped. After the seeds were dropped, the seeds were pressed lightly into the soil.

Results of the Seedlings

The field survival data for the seedlings was taken in November, 1960 (Burruss) and January, 1961 (Flippo). Both percent stocking and number seedlings computed on an acre basis. Percent stocking also reflects the percent of spots seeded filled with one or more seedlings. Probability 2 to 1. The results are as follows:

Burruss Tracts

<u>Site</u>	<u>(Non-Stratified)</u>		<u>(Stratified)</u>	
	<u>% Stocking</u>	<u>No. Seedlings</u>	<u>% Stocking</u>	<u>No. Seedlings</u>
Field	69.0 $\pm$ 3.5	1286 $\pm$ 111	49.5 $\pm$ 5.6	957 $\pm$ 101
Out-over	34.8 $\pm$ 4.9	595 $\pm$ 68	43.3 $\pm$ 4.1	776 $\pm$ 97
Bulldozed	62.4 $\pm$ 4.5	714 $\pm$ 74	40.9 $\pm$ 1.7	743 $\pm$ 83

Flippo Tract

<u>Site</u>	<u>(Stratified)</u>	
	<u>% Stocking</u>	<u>No. Seedlings</u>
Bulldozed	60.7 $\pm$ 3.8	993 $\pm$ 56

With respect to stocking percents obtained in the Burruss tracts, a highly significant difference (1% level) arose when comparing non-stratified

cut-over seeding results with either non-stratified bulldozed or field seedings. In using stratified seed no significant differences in stocking percent arose among any of the three sites tested.

Number of Seedlings Per Spot

The number of seedlings present per spot ranged from 0 to 6. Of the spots containing one or more seedlings, nearly 40 percent of these spots contained two or more seedlings per spot.

R. L. Marler

January 31, 1961