

# small landowners can direct-seed too

Louisiana is the birthplace of direct-seeding, and it leads all other States in the acreage reforested to pine by this new method. Direct-seeding techniques were perfected at Alexandria by research scientists of the Southern Forest Experiment Station, working in cooperation with many local landowners. Since 1957, when the researchers discovered repellents for protecting seeds from birds, rodents, and insects, several hundred thousand acres have been sown in the State. Savings over the cost of planting seedlings have totaled nearly 2 million dollars.

Successes here led to rapid expansion, and now many of the industrial landowners from Virginia to Texas are seeding on a large scale. The method is suited both to the flat lands of the Coastal Plain and to the mountains; to wet and dry sites; to open, grassy lands and to areas dominated by cull hardwoods.

Probably because most of the pioneering work was done by industrial landowners, many people think that direct-seeding is best suited for big operations.

In 1961, Louisiana's State Forester James E. Mixon decided it was time to determine if tree farmers could direct-seed with the same success as their big neighbors. Foresters of the State Extension Service, State Forestry Commission, and U. S. Soil Conservation Service teamed with researchers of the U. S. Forest Service to conduct a 3-year series of trials in cooperation with typical owners. This article summarizes the results.

Briefly, the tests showed that the method works on properties of all sizes. It is inexpensive and fast, and requires no more skill than for planting nursery-grown seedlings. Advice and assistance from a forester are desirable, at least on the first few attempts, and such aid is available from State and Federal agencies.

## Details of Studies

Each year for 3 years two studies were established on tracts chosen as typical of depleted farm woodlands. Loblolly or slash pine was used, depending on the species preference of the owner. All six of the acres had been clearcut of pines and had re-

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verted to cull hardwoods. Two were covered with dense stands of brush, composed of thousands of small hardwood stems per acre. The others had fewer but larger hardwoods.

The general pattern in all trials was to compare two methods of seeding with planting of nursery stock. One type of sowing was to broadcast one pound of seed per acre on a fresh burn, made to destroy the mat of leaves that would prevent seeds from reaching mineral soil. The second was to rake or kick the leaves from a spot about one foot square and drop five to seven seeds on it. In the first four trials, five seeds were dropped on each of 908 spots per acre; the rate was increased to seven seeds and 1,200 spots in the last two trials. Spotting is a method that can be used where landowners do not have the equipment to burn safely or are unwilling to risk fire spreading to adjacent property. Seed for all trials was stratified for quick germination, coated with repellents, and sown in late February. Plantings were made at spacings of 6 by 8 feet.

All three summers from 1961 through 1964 were extremely dry in central Louisiana. In 1962 extreme drouth conditions caused hardwood leaves to shed prematurely in the fall. The spring of 1963 was one of the driest on record, and it was followed by a dry autumn. In 1964 there was an early drouth, which delayed germination, and a prolonged dry period that extended from June to October.

## Results

Considering the severity of the weather, both planting and seeding were remarkably successful. Results of the

18 individual attempts—12 seedings and 6 plantings—are summarized in table 1. All but four resulted in well-stocked stands. Three of the four exceptions were partially stocked with 300 to 400 seedlings per acre; the other was nearly a complete failure.

Extensive clipping by rabbits caused the planting failure in study 6. This site had dense patches of grass that provided a good cover for these animals. Burning in advance might have reduced losses by destroying their habitat.

Both methods of seeding failed in study 2, where the site was partially flooded and heavily grazed by cattle. The successful plantation in this study was situated above floodwater and was grazed lightly. It was recognized at the start that this was a difficult site to seed without repeated burns to kill back the dense cover of vines and brush, and without protection from livestock.

The second failure of seed spotting (study 4) was due entirely to a dry site and excessive competition from grasses in the openings between hardwoods. This attempt clearly demonstrated that survival of pines is enhanced by a hardwood overstory. While most of the seedlings in the openings died, survival was high directly beneath hardwoods, where competing grasses had been shaded out.

Broadcasting consistently yielded substantially more seedlings per acre than spotting—a logical result of the higher sowing rate. Generally, spotting is the riskier of the two methods, because leaves often blow back over the spots and smother new seedlings. Chances for success are improved by scattering leaves rather than piling them up on the edge of the spot, and by sowing enough seed.

These studies give a good clue as to the minimum number of spots needed per acre and the number of seeds per spot. Where five seeds were placed on each of 908 spots per acre, stands were barely adequate. Increasing the number of spots to 1,200 per acre and seeds per spot to seven provided too many seedlings. Hence, the optimum rate appears to be intermediate—six seeds on each of 1,000 spots.

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There is little or no difference in cost between the two methods of seeding. Spotting requires less seed than broadcasting, but labor costs are higher. In a dense hardwood stand, one man can cover 12 to 15 acres daily with a hand-operated grain seeder but only 2 or 3 acres by spotting. If seed costs \$4.00 per pound, total expense by either method should not exceed \$6.50 per acre. Planting similar sites will cost about \$12.00 per acre.

Direct-seeding is easy and reliable, especially on sites with a hardwood overstory. The trees shade out the grasses that are so detrimental to pines in the first growing season. It is highly important, however, to deaden overtopping hardwoods soon after germination is completed and before the onset of hot, dry weather. If the hardwoods are left alive they will kill pines by depriving them of light and moisture.

Open areas with a heavy grass sod were needed in these studies. For consistent success, it is essential to disk such sites to set back the grass. Ordinarily, it is recommended that small open areas be planted; planting costs only slightly more than seeding, because disking is not needed.

### Summary of Recommendations

Here are a few rules for tree farmers to follow in seeding either slash or loblolly pine:

Carefully study the recommendations contained in booklets published by the Southern Forest

Experiment Station. Free copies can be obtained by writing to the Southern Forest Experiment Station, T-10210 Federal Building, 701 Loyola Avenue, New Orleans, La. 70113.

Ask local representative of Louisiana  
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TABLE 1. SUMMARY OF SIX SEEDING AND PLANTING TRIALS CONDUCTED FROM 1962 TO 1964  
Seedlings per acre at end of first year

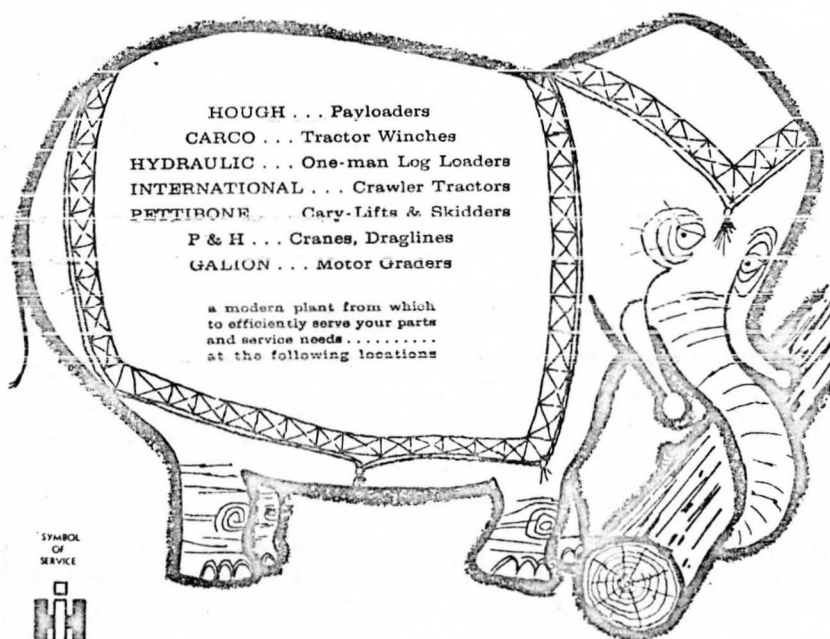
| Study | Description of area                                                                                                                                                                                                                                    | Species  | Broadcast          | Spot               | Planting |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|--------------------|----------|
|       |                                                                                                                                                                                                                                                        |          | sowing             | sowing             |          |
| 1     | Rolling topography and sandy loam soil. Dense stand of small hardwoods averaging about 3,000 stems per acre.                                                                                                                                           | Loblolly | 7,560 <sup>1</sup> | 981                | 563      |
| 2     | Flat site with poorly drained soils subject to flooding. Area had a dense mixture of pine tops, small brush, and briars. Openings were heavily grazed. Repeated burns before regeneration were needed, but not made, to reduce brush and ground cover. | Loblolly | 320                | 190                | 581      |
| 3     | Site gently rolling; soils moderately permeable. Dense stands of oaks averaging about 5 inches d.b.h. Little or no brush present.                                                                                                                      | Slash    | 2,760              | 1,090              | 690      |
| 4     | Flat site with poorly drained soils. Light to moderate stocking of blackjack and post oaks. Heavy stand grass in openings.                                                                                                                             | Slash    | 2,160              | 400                | 654      |
| 5     | Gently rolling site; sandy loam soils. Blackjack and post oaks, averaging about 7 inches d.b.h., fairly well dominated the area.                                                                                                                       | Slash    | 5,680              | 2,530 <sup>2</sup> | 863      |
| 6     | Topography gently rolling. Well-drained sandy loam soils. Hardwoods dense, mainly in trees over 4 inches d.b.h.                                                                                                                                        | Loblolly | 4,880              | 1,920 <sup>2</sup> | 400      |

<sup>1</sup> Broadcast sowing rate was 1 lb. per acre, except in study 1 where it was 1.3 lb. per acre.

<sup>2</sup> Spot sowing in studies 5 and 6 consisted of seven seeds on each of 1,200 spots per acre; in previous studies five seeds and 900 spots were used.

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iana Forestry Commission, Soil Conservation Service, or Extension Service for guidance on choosing the site, species to be sown, and method of seedbed preparation.

Order seed from a reputable dealer, specifying it to be stratified for 30 days and coated with the liquid repellent consisting of Arasan 42-S, Endrin 50-W, and a latex sticker. Keep seed refrigerated at about 40° F. until it is sown.

Where hardwoods are abundant, either broadcast 1 pound of seed per acre after destroying leaf cover by burning, or sow 1,000 spots per acre with six seeds per spot. Spots should be about 1 foot square. To prevent blowback, leaves should be scattered rather than left in a pile on the edge of the spot.

Generally, it is best to plant small tracts that are open and grassy. If they are seeded, the site should be disked about 6 months before sowing.

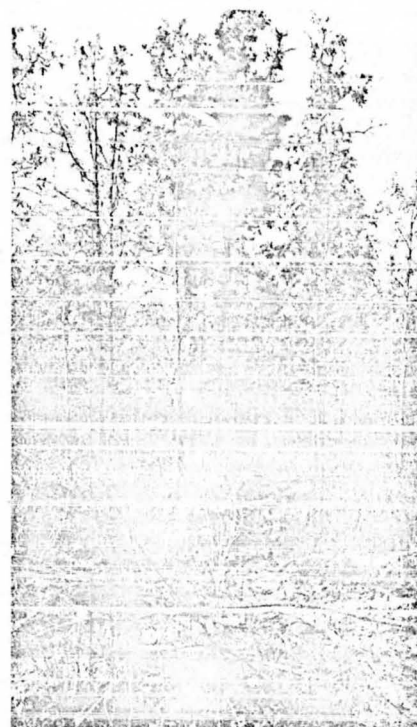
With either species, sow when buds on hardwoods begin to enlarge, or about 2 weeks before the last killing frost.

Deaden overtopping hardwoods not later than June of the first year.



A

Protect stands from livestock for 3 or 4 years.



B

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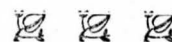
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