Planting Tests on the Shallow Soils of Eastern Ontario

Jack Pine, White Spruce and White Cedar Appear Promising for the Smith Falls and Napanee Plains

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In 1959, 1960 and 1961, test plantings were made on the commonly called "shallow lands" of Eastern Ontario. These sites consist of siliceous sands, moderate to high lime loams, silt, and clay, and organic mixtures, from a few centimeters to 100 centimeters in depth, and overlying well-fissured limestone plains. These plains extend over 2,500 square miles, although some areas have much deeper glacial deposits, the eastern part known as the Smiths Falls Plain; the western part, the Napanee Plain.

Procedure

Two tests were established in the Kemptville District (Wolford Township) in the Smiths Falls Plain. In one test, six species (white spruce, *Picea glauca* (Moench) Voss ; tamarack, *Larix larincina* (Du Roi) Koch; jack pine, *Pinus banksiana* Lamb; white pine, *Pinus strobus L;* white cedar, *Thuja occidentalis L;* and Serbian spruce, *Picea omorika)* were planted in randomized rows of 25 trees each, one row with scalping (approx. 30 *x* 30 cm), and another directly in sod. There were four replications in separate blocks. In the second test, four species (tamarack, white pine, white cedar, and white spruce) were planted with fresh stock from Kemptville Nursery at three different times of fall planting at 4-week intervals in September, October, and November, and three times of spring planting in April, May, and June. This was done in five replications, 21, rows of 25 trees in each.

Another test was planted in Tweed District (Hungerford and Thurlow Townships) in the Napanee Plain comparing the same six species in scalped and unscalped procedures as in the Kemptville test. An unsuccessful attempt was made to establish beech *(Fagus grandi jolia* Ehrh) and hard maple *(Acer saccharurn* Marsh.) by direct seeding, with and without screens.

Results and Discussion

The average heights and survival at 10 years after planting, for both Kemptville and Tweed species tests, are shown in table 1. At Kemptville, jack pine and white cedar were most promising. At Tweed, white spruce and jack pine appeared better than other species. The remarkable early growth rate of tamarack, however, is worth noting.

The results of the season-of planting test at Kemptville are summarized in table 2. In the analyses of heights, differences between species were highly significant (0.01

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TABLE 1.—Tenth-year average heights and survival

	Kemptville		Tweed	
	Height cm	Survival percent	Height cm	Survival percent
White spruce				
scalped	98.0	12.0	117.2	55.0
not scalped	96.6	18.7	151.2	36.0
Tamarack				
scalped	356.5	2.7	367.6	17.0
not scalped	364.0	1.3	337.2	7.0
Jack pine				
scalped	249.0	56.0	(280.0) [1]	(70.0) [1]
not scalped	252.1	48.0	–	–
White pine				
scalped	90.5	16.0	97.0	33.0
not scalped	104.7	9.3	121.3	37.0
White cedar				
scalped	113.4	46.7	86.2	39.0
not scalped	138.3	61.3	91.7	32.0
Serbian spruce				
scalped	88.7	14.7	63.1	30.0
not scalped	110.9	24.0	68.8	11.0

[1] Substituted figures from adjacent 0.5 acre plots.

(Continued from page 9) percent), and differences between times also significant (0.1 percent). Table 2 also incorporates an aggregate height comparison (survival percentage times average height per acre).

Tamarack was omitted from aggregate height comparison because of low survival. White pine was least successful of the remaining three. While white cedar gave better aggregate height than did white spruce because of better survival rates, neither species gave as good aggregate height as jack pine at Kemptville, table 1, which works out at about 169,000 cm per acre at 10 years. In all species there was a height growth reduction from late planting, that is, after October in the fall and after flay in the spring.

TABLE 2.—Tenth-year average heights, survivals, and aggregate heights (survival × height, per acre) for season-of-planting tests. Kemptville District

	Sept.	Oct.	Nov.	April	May	June	Average
Tamarack							
Survival, percent	4.8	4.0	9.6	5.6	3.2	4.8	5.3
Height, cm	319.8	367.4	357.7	393.4	415.0	376.7	368.0
White pine							
Survival, percent	34.4	27.2	23.2	28.0	24.0	35.2	28.7
Height, cm	220.7	220.4	213.8	233.9	217.3	181.5	213.4
Aggregate ht., cm	91,600	72,500	60,000	79,200	63,100	77,300	74,100
White cedar							
Survival, percent	69.6	59.2	72.0	62.4	61.6	62.4	64.5
Height, cm	163.4	164.8	153.5	158.5	159.5	140.6	156.7
Aggregate ht., cm	137,600	118,000	133,700	119,700	118,900	106,200	122,300
White spruce							
Survival, percent	38.4	51.2	47.2	43.2	64.0	58.4	50.4
Height, cm	179.3	165.8	157.4	163.2	182.7	159.6	168.2
Aggregate ht., cm	83,300	102,700	89,900	85,300	141,500	112,800	102,600

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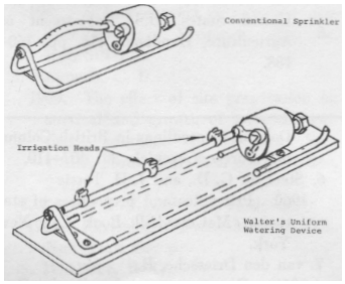
4 feet. He then substituted a long aluminum tube on which he mounted commercial spray nozzles for the discarded oscillating pipe.

He then adjusted the spray nozzles for even water distribution. When mounted above his benches, Jerry had very even water distribution. A drawing is given below.



The Oregon/Washington Silvicultural Council made a survey of topics of interest late last year, and located comparative outplantings of bullets, plugs, and conventional planting stock.

First visited were some plots Dr. Peyton W. Owston had put out in February of '72. Two 20-tree rows per stock type were arranged in random order. Styro-2, 2-0, and 1-1 Douglas-fir were compared. Overall survival rates were 75 percent-76 percent and 72 percent respectively. Overall average heights were 27, 40 and 46 cm respectively; hence seedlings, large when planted, continued to be larger in subsequent years.

Survival varied by planting aspect. The Styro-2 did least well on a SW aspect, 2-0 least well on a WSW aspect, and 1-1 least well on the NW aspect. There was little significant difference in the overall average survival, demonstrating that seedlings must he tailored to site regardless of whether grown in the greenhouse or in the ground.

Next the tour group (90 strong) visited Georgia-Pacific plots comparing Douglas-fir grown in bullets and plugs. The bullets were not in the running (27 percent survival). The plug had clone better (68 percent) (3-year survival figure). Phil Hahn, the company's chief research forester, says plugs have, on the average, had 10 percent better survival than barerooted stock.

The following day, the tour group (now 72 strong) visited the Coast Range. There they saw International Paper Company Douglas-fir plots and Dr. Owston's hemlock plots. Dr. Owston is with the Pacific Northwest Forest and Range Experiment Station. Both International Paper and the Station provided excellent documentation for all plots visited.

Hemlock plugs had better survival and height growth than conventionally grown stock-two years after planting (96 percent vs 85 percent and 74 cm vs 59 cm).