Provenance Test Selection at the Provincial Tree Nursery

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Preliminary results of provenance tests of Colorado blue spruce, Scotch pine, and European white spruce in Alberta are given.

Selection and evaluation of *Pinus sylvestris, Picea abies,* and *Picea pungens* from several Russian, European, and North American origins were carried out in the 1979 season at the Provincial Tree Nursery. The evaluation was designed for shelterbelt and ornamental plantings rather than for increased wood requirements. The selection aim was primarily to obtain hardy trees with good form, branch structure, and color holding ability for amenity plantings in Alberta.

Development

There were 62 provenances replicated in three blocks. In May 1972, seedlings were planted as 2+0 stock with a spacing of 1.5 by 3.0 meters on the Provincial Tree Nursery site at Edmonton, Alberta. The three rows of 10 seedlings were randomly replicated into three blocks. Seedlings were maintained at a provenance site by the nursery staff until 1978-79, when selections were made on the basis of hardiness, form, and color retention for shelterbelt and ornamental uses. A scale of 0 to 3 was used, 0 indicating dead seedlings, poor form (branching habit), and extreme yellowing or very poor coloring. The rating 3 indicates hardy, living seedlings of comparable growth to the local lodgepole pine (*Pinus contorta latifolia*) and white spruce (*Picea glauca*) used as controls (table 1). It also indicates good full form, even well-spaced branches, and excellent color retention (nonyellowing foliage) with acceptable bark coloring for Pinus sylvestris. In 1979, the control lodgepole pine averaged 1.5 meters in height and the control white spruce averaged 1 meter. The seedlings appeared to be somewhat damaged by farm equipment. Some attempt was made to account for this mechanical damage in rating the seedlings.

After the selections were made, those with an aggregate total of 5 or more were planted in spring 1979 into a seed orchard area on a spacing of 3 by 6 meters.

Those replanted are shown as follows with their ratings:

Picea pungens:
- Kaibab Forest, Stanford, Mont. (5)
- Moscow, Idaho (8)
- Pike, Pikes Peak, Colo. (6)
- Western Evergreens, Golden, Colo. (7)
- Manti-LaSal National Forest (5)
- Stevensons Nursery, Manitoba (7)
- San Isabel Forest, West Cliff, Colo. (5)

Picea abies:
- Vesijako, Finland (5)
- Tuusula, Finland (5)
- Jokioinen, Finland (5)
- Solböle, Finland (8)
- Ahyenanmaa, Finland (6)
- Tveit, Norway (5)
- Steinkjer, Norway (7)
- Trysil, Norway (5) (high elevation selection)
- Blekinge, Sweden (5)
- Uppsala, Sweden (5)
- Polotskii, Vitebsk, White Russian (7)
- Minskii, Minsk, White Russia (5)

Pinus sylvestris:
- Solböle, Finland (6)
- Vilppula, Finland (7)
- Kerimaki, Finland (10)
- Hvaler, Norway (8)
- Polish strain (7)
- Kristianstad, Sweden (3)
- Kristianstad, Sweden (11) (high elevation)
- Skaraborg, Sweden (7)
- Kopparberg, Sweden (8)
- Gävleborg, Sweden (8)
- Novousmanskoe Forest, Leshos P-3 Woronesh District, U.S.S.R. (7)
- Neruskovskoe Forest, Dmitrovski Leshos, Orlovsk District, U. S. S. R. (7)

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Table 1.—*Provenances tested at the Provincial Tree Nursery, Edmonton*

Species and origin	Elevation	Criteria			
		Hardiness	Form	Foliage color	Bark color
Blue spruce *(Picea pungens)*					
Kaibab Forest, Stanford, Mont. (1/A)[1]		1	2	2	—
Moscow, Idaho (4/A)	2,400 ft	3	2	3	—
Provo, Utah (5/A)	9,000 ft	1	0	1	—
Pikes Peak, Colo. (6/A)	9,000 ft	2	2	2	—
Western Evergreens, Golden, Colo. (7/A)		2	3	2	—
Manti-LaSal National Forest, Water Terrace, Price, Utah (8/A)	8,000 ft	2	2	1	—
Indian Head, Sask. (9/A)		1	1	1	—
Stevensons Nursery, Man. (10/A)		2	2	2	—
San Isabel Forest, West Cliff, Colo. (11/A)	9,000 ft	2	2	1	—
White spruce *(Picea abies)*					
Vesijako, Finland (1/F)	100 m	2	1	2	—
Tuusula, Finland (2/F)	50-60 m	2	0	2	—
Jokioinen, Finland (3/F)		1	2	1	—
Solböle, Finland (4/F)	20 m	3	2	3	—
Kalhia, Finland (5/F)	100 m	0	0	0	—
Ahyenamnaa, Finland (6/F)	20 m	2	2	2	—
Koli, Finland (8(F)	100 m	0	0	0	—
Rothenkirchen, Germany (1/G)		0	0	0	—
Tveit, Norway (5/N)	140 m	2	2	1	—
Steinkjer, Norway (6/N)	140 m	2	1	2	—
Trysil Aomot, Norway (7/N)	400 m	0	0	0	—
Trysil, Norway (8/N)	700 m	3	2	3	—
Trondheim, Malvik Stjerdal, Norway (9/N)	140 m	0	0	0	—
Malmöhus, Sweden (1/S)	75 m	1	2	1	—
Blekinge, Sweden (?JS)	150 m	2	1	2	—
Jönköping, Sweden (3/S)	260 m	0	0	0	—
Skaraborg, Sweden (4/S)	135 m	0	0	0	—
Uppsala, Sweden (6/S)	50 m	2	2	1	—
Polotskii, Vitebsk, Russia (2/R)	150 m	2	3	2	—
Minakii, Minsk, Russia (3/R)	150 m	2	1	2	—
Volozhinskii, Minsk, Russia (4/R)	150 m	1	1	1	—
Konoshskii, Archangel, Russia (5/R)	50 m	0	0	0	—

See footnote at end of table.

Table 1.—*Provenances tested at the Provincial Tree Nursery, Edmonton*—Continued

Species and origin	Elevation	Criteria			
		Hardiness	Form	Foliage color	Bark color
Scotch pine (*Pinus sylvestris*)					
Solbole, Finland (21/F)	30 m	2	2	1	1
Vesijako, Finland (27JF)	115 m	2	1	1	0
Vilppula, Finland (23/F)	110 m	2	1	2	2
Kerimaki,Finland (24/F)	80 m	2	3	2	3
Pyhajoki, Finland (25/F)	80 m	1	1	2	0
Koli, Finland (26/F)	130 m	1	0	0	1
Kivalo, Finland (27/F)		2	1	0	1
Salla, Finland (28/F)	220 m	1	0	0	1
Sund, Finland (29/F)	20 m	1	1	0	2
Rovaniani, m, 1k, Finland (30/F)	160 m	1	0	0	1
Amot, Norway (20/N)	200 m	0	0	0	0
Hvaler, Norway (21/N)	100 m	2	2	2	3
Steinlqer, Snosa, Norway (23 /N)	100 m	0	0	0	0
Steinkjer, Norway Strain (24/N)	150 m	1	1	0	1
Polish Strain (20/P)	80 m	2	1	2	2
Kristianatad, Sweden (20/S)	38 m	3	2	2	3
Kristianatad, Sweden (21/S)	33 m	3	3	2	3
Jonkoping, Sweden (22/S)	250 m	0	0	0	0
Skaraborg, Sweden (23/S)	155 m	2	3	1	1
Kopparberg, Sweden (24/S)	100 m	2	2	2	1
Gavleborg, Sweden (25/S)	200 m	2	2	2	2
Visternorrland, Sweden (27/S)	250 m	1	0	0	0
Vasterbotten, Sweden (28/S)	100 m	1	2	0	1
Vasterbotten, Sweden (29/S)		0	0	0	0
Norrbotten, Sweden (30/S)	340 m	0	0	0	0
Novousmanakoe Forest, Russia Lesbos P-3 Woronesh District (20/R)		2	2	2	1
Nezsiloviskoe Forest, Russia Teterevski Lesbos Kiev District (21/R)		1	0	0	1
Neruskovakoe Forest, Russia Dmitrovski Lesbos Orlovsk District (22/R)		2	2	1	2

[1]Numbers and letters in parentheses denote geographic location of seed source

Discussion

This evaluation was preliminary and may be further improved as the trees mature. It appears to show that those trees from the southern parts of Finland and Sweden had a better average height growth than those from northern sources. There are also a large number of high-elevation seedlings among those retained. They seemed to retain bark and needle color better.