

TREE SEEDLING SIZE DESCRIPTION CODE

by

Lewis A. Nicholson  
U. S. Forest Service  
Portland, Oregon

Good morning Ladies and Nurserymen. I am glad to be here - thanks to Bud Mason.

Tree seedlings have been produced at nurseries for decades. The normal method of seedling description has been age. Other descriptive adjectives have been added from time to time such as small, medium, large, poor, good, and excellent. These descriptive adjectives sounded good, but added very little to consistent classification of tree seedlings because the seller used a different one than the buyer.

Some early work was done by Phillip C. Wakeley, "Physiological Grades of Southern Pine Nursery Stock," published in the Society of American Foresters proceedings in 1948.

Enclosure 1 is a committee report on Nursery Stock Measurements procedures published in the Journal of Forestry No. 67, pages 52-53 in 1969.

Enclosure 2 is the recommendations of the committee on planting stock description for the Western Forestry and Conservation Association a couple years later.

The Weyerhaeuser Company, State of Washington, Bureau of Land Management, and U. S. Forest Service agreed on a format presented at the Western Nurserymen's Meeting last fall.

Followed by Weyerhaeuser Company putting a size description in their regeneration catalog, Region 6, U. S. Forest Service has started using this system on their inventories.

Don Perry, Nurseryman at the Humboldt Nursery, Region 5, has measured several lots of trees by this Description Code. The results are very encouraging as shown on Enclosure 3. In most cases, the Tree' Seedling size Description Code described the tree lot within the defined parameters.

We have (Region 6, U. S. Forest Service) started using the Tree Seedling Size Description Code. One forest has issued instructions to their Districts to order one of three tree sizes. One forest issued a picture of trees showing different combinations of root-shoot ratios, calipers, and heights they received from two different nurseries. The Wind River Nursery is issuing a regeneration catalog showing the estimated tree sizes the nursery intends to produce and the Bend Nursery is keeping a pictorial record of trees produced. In time the Bend Nursery will issue a size production catalog.

We have made a start using the Tree Seedling Size Description Code. The Tree Seedling Size Description Code we are using is:

Tree Seedling Size Description Code

B - **40** - **06** - 0.6 - 745  
(1) (2) (3) - (4) (5)

1. B = Bare Root  
P = Plug  
C = Container  
P B = Plug transplanted to Bare Root
2. Height
  - a. Will be measured to the nearest centimeter.
  - b. Will be measured from the cotyledonary node to the tip of the terminal bud on undamaged trees and on damaged trees to the highest point on the central live stem.
  - c. Will be an average for each lot. Ten trees will be sampled at each random point normally sampled for the nursery inventory.
  - d. The desired accuracy would be that 75 percent of the trees will be plus or minus 25 percent of the lot average.
3. Caliper
  - a. Diameter will be measured to the nearest millimeter.
  - b. Will be measured approximately one centimeter above the cotyledonary node.
  - c. Will be measured where the stem is round and avoiding internodal swelling.
  - d. Will be an average for each lot with the same sample size at heights.
  - e. The desired accuracy will be that 75 percent of the trees are within plus or minus one millimeter of the lot average.
4. Root/Shoot Ratio
  - a. Will be measured by a volumetric method.
  - b. Will use apparently live tissue discarding obviously dead tissue.
  - c. Will wash roots before measuring.
  - d. Will be an average for the lot using the sample as for height.
5. Proposed Planting Season (Year Desired)
  - a. Will be a three digit code.
  - b. First two digits are the year of the fall planting season.
  - c. Third digit is the year of the following spring planting season.

I have some pictures to illustrate how the Tree Seedling Size Description Code applies to specific tree lots. The tree lot 205-11-072-050-2.5 (2-0 Douglas fir) was grown at the Humboldt Nursery in McKinleyvale, California. The Tree Seedling Description Code for this lot of trees is B-35-05-0-745. The root/shoot ratio was not determined for this lot. The largest tree in the lot is picture 1 with a description code B-58-13-0.6-745. The average tree for the lot is picture 2, B-35-05-0.3-745.

The smallest tree in the lot is shown in picture 3 with a code of B-22-03-0.4-745. There is a wide range in the size and quality of trees in a given lot. However, the required percentage of trees were within the prescribed parameters of the Tree Seedling Size Description Code. The ranges are an average a tree lot.

There is also a variation between different lots. Tree Seedling Size Description Code for the largest tree size lot was B-38-05-0.6-745, picture 4. The Smallest tree size lot, Tree Seedling Size Description Code B-18-03-0.2-745, picture 5.

It is interesting to know the smallest tree in the smallest average lot is coded B-04-01-0.4-745 and is a two year old tree, also. All of these 5 trees are Douglas fir 2-0 grown at one nursery.

Now we will look at Jeffrey pine grown at the Humboldt and Wind River Nurseries. Here we find that the two nurseries can produce approximately the same size trees.

<u>Nursery</u>	<u>Code</u>	<u>Tree No.</u>
Humboldt	B-18-04-0.8-745	6
Wind River	B-18-04-0.7-745	7
Humboldt	B-14-03-0.7-745	8
Wind River	B-21-05-0.6-745	9
Wind River	B-21-06-0.2-745	10

The last tree was added to show how the code can reflect the change in root shoot ratio.

We are developing and using the Tree Seedling Size Description Code for the following reasons:

1. To improve communications between the field and nursery on a quantitative rather than a descriptive basis.
2. To express nursery inventories on a size basis.
3. To express survival in terms of tree size.
4. To order trees in terms of size.
5. To provide a common basis for research.

I feel the most important is No. 1. We need to communicate.

Research and survival records indicate that age is not the major criteria for field survival, but that the physical size and proportions are the most important items.

I have seen 2-year old Douglas fir range from one and one-half inches to six and one-half feet. Neither one was suitable for field planting. The point being that age class means totally a different **type** of tree from different nurseries and 2-0 means a different size at each one and then we add six or more species which react different in time frame and we really need a tree seedling size description code.

We are still developing this size code and I expect to make more changes to make it more workable. I would like to have any comments at any time.

ENCLOSURE 1

Report of the Ad Hoc Committee  
on Nursery Stock Measurement Procedures

At the Ottawa meeting in October 1967, the Forest Tree Seed Committee of the Division of Silviculture recommended that the chairman appoint "an ad hoc committee to examine the needs for standardization of nursery stock measurement procedures and recommend a course of action."

Silas Little, chairman, appointed a committee consisting of J. M. Buck, W. H. Brener, Sanford Darby, E. J. Eliason, Paul E. Slabaugh, William I. Stein, and Sidney H. Hanks.

A questionnaire was circulated to determine:

1. Are standardized measurement procedures desirable?
2. Do they currently exist?
3. Is one procedure satisfactory for both hardwood and conifer seedlings?

Committee members replied to the questionnaire and a summary follows:

Standardized measurement procedures are desirable. Measurement procedures currently used for describing nursery stock are not uniform.

Caliper measurements in conifers are currently taken at the root collar or ground line, at the base of the cotyledons in conifers and one inch below the cotyledonary scars.

Height measurements are taken from the point of caliper measurement to the top of the terminal bud, or to the base of the terminal bud, and in the absence of a terminal bud, to the highest point of the central stem.

Root-shoot ratio is not widely employed in describing nursery stock due to laborious methods for determination. It remains primarily a research tool.

Common measurement points for measuring both conifer and hardwood seedlings are desirable. The committee recommends that the Division of Silviculture sponsor inclusion of the following definitions in Forestry Terminology at the next revision:

Seedling Caliper.--Diameter of a seedling stem measured at the root collar. This is a point one inch below the cotyledonary scars in conifers. In practice, this is assumed to be the undisturbed ground line.

Seedlings Height.--Height measured from the root collar or ground line to the base of the terminal bud, if present or to the highest point of the central stem if terminal bud is absent.

These definitions are in keeping with current practice. They are in basic agreement with the American Standards for Nursery Stock sponsored by American Association of Nurserymen.

Journal of Forestry 67: 52-53. 1969

ENCLOSURE 2

Recommendations of  
Committee on Planting Stock Description  
to the  
Western Forest Nurserymen's Association  
Western Forestry & Conservation Association

- A. The following recommendations concerning description of planting stock include items obvious at the moment that should be a matter of record for the future as well as items necessary to the immediate description.

Forest tree planting stock shall be identified by species, seed source, nursery at which raised, age, class, average height, and average stem caliper.

1. Species: The use of scientific nomenclature is to be encouraged.
2. Seed Source: The identification of seed source shall be that assigned by the individual or organization supplying the seed.
3. Nursery: The name and location of the nursery producing the stock shall be recorded.
4. Age Class; A three-digit numerical code shall describe the period of growth in the seedbed, transplant bed, and the season of sowing. (See Table 1.)
5. Average Height: The average height of seedlings shall be expressed in 5-centimeter classes as follows:

Class	Range
05	2.6-.7.5 cm
10	7.6-12.5
15	12.6-17.5
etc.	

The computed average shall be based upon not less than 25 seedling heights. Measurements in whole centimeters shall be made from the cotyledons (the first leaves) to the base of the bud for pines or to the tip of the bud for other species.

6. Average Caliper: The average diameter of stem shall be expressed in one-millimeter classes as follows:

<u>Class</u>	<u>Range</u>
02	1.6-2.5
03	2.6-3.5
04	3.6-4.5
etc.	

The computed average shall be based upon those seedlings measured, in whole millimeters, in the area immediately below the point of cotyledons.

7. Average Root Length: No adequate and easily determined description of roots relating to survival and growth is available. However, root length is closely related to ease of planting. Therefore, average maximum root length shall be expressed in 5-centimeter classes as follows:

<u>Class</u>	<u>Range</u>
15	Less than 15 cm
20	16-20
25	21-25
etc.	

The computed average maximum shall be based upon measurements of those seedlings measured for height. Measurements in whole centimeters shall be made from the cotyledons to the tip of the mass of roots (ignoring the occasional long stringy root).

8. Descriptive item in addition to those basic elements above may be needed for specific cases.
  9. Unusual circumstances shall be noted.
- B. The use of a scale (Fig. L) to facilitate the collection of data on a seedling lot in the nursery is recommended.
  - C. The Nurserymens Association should consider the establishment of limits for the permissible variation within seedling lots such as those set forth in Table 2. Limits would provide a standard by which to gauge stock. Those lots with variation greater than the standard could be subdivided to bring the variation within the accepted tolerance. Adoption of standards is a first step towards controlling the uniformity of the product.
  - D. The following recommendations are to improve the mutual understanding of problems confronting nurserymen and planters.
    1. The nurseryman should assist in isolating causes of planting failure by maintaining for one season a transplant bed of 100 trees each of sample lots set out at the time of shipment of major lots or lots of questionable condition.



2. The nurseryman should prepare a photographic record for his nursery to (1) demonstrate the dimensions of stock produced, (2) provide a record of change over time, and (3) educate the planter in seedling morphology.
3. Planters employing special planting stock should plant also 100 or more seedlings of standard 1-0 or 2-0 size in problem area plantations. By such tests in which detailed records of techniques are maintained, the planter can contribute substantially to our empirical knowledge of planting stock requirements.

Progress in developing planting stock to meet various silvicultural requirements can be speeded by basic studies in which the planting stock, its handling, and its planting are described in detail. Well-documented tests in the course of regular planting will help. Both nurseryman and planter should encourage basic study by research personnel of the problems of nursery production and plantation establishment.

---

James Dick

Committee for description of  
planting stock

Charles A. Bigelow,  
John Revel,  
Lloyd Soule,  
Homer S. Ward,  
James Dick, (Chairman)

James Dick  
rcc

Table 1. Numerical description of age of forest tree planting stock.

Code	Season of Sowing	Period In Seed Bed	Period In Transplant Bed
		(yrs)	(yrs)
100	Spring	1	0
150	Fall	1	0
200	Spring	2	0
250	Fall	2	0
300	Spring	3	0
350	Fall	3	0
101	Spring	1	1
151	Fall	1	1
201	Spring	2	1
251	Fall	2	1
102	Spring	1	2
152	Fall	1	2
202	Spring	2	2
252	Fall	2	2

Table 2. Suggested maximum variation permitted within seedling lots.

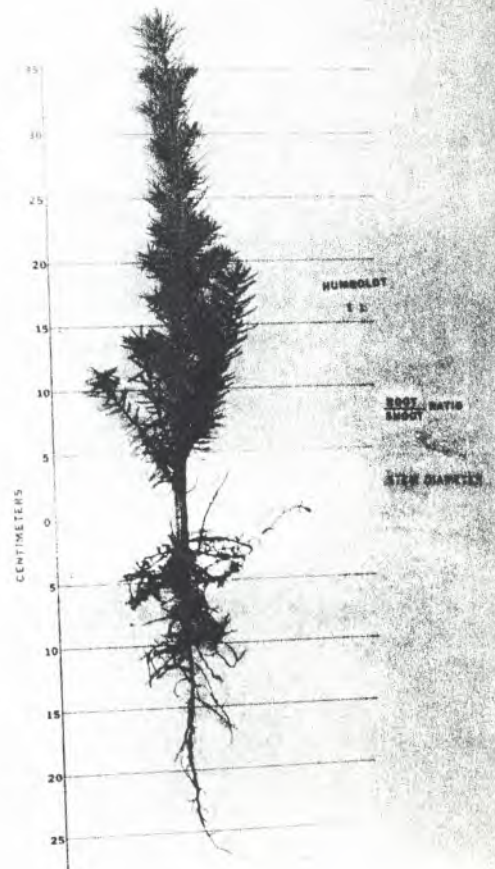
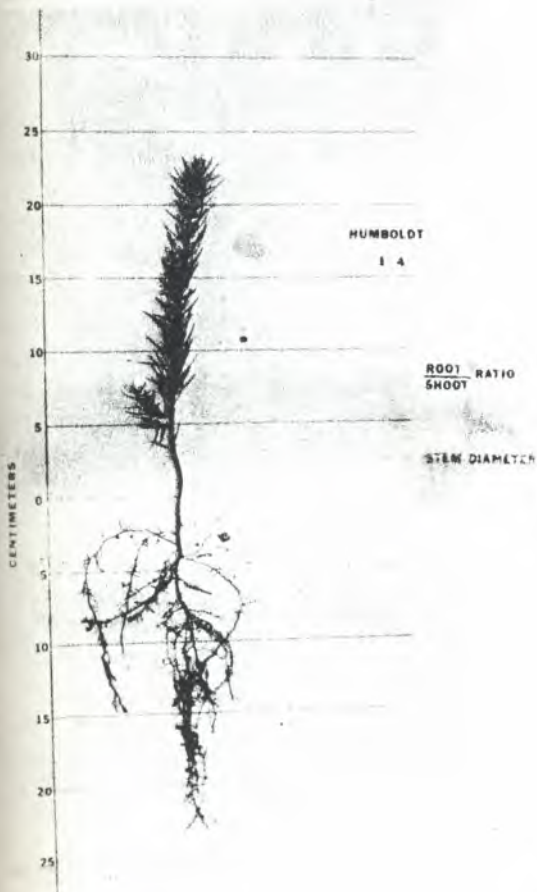
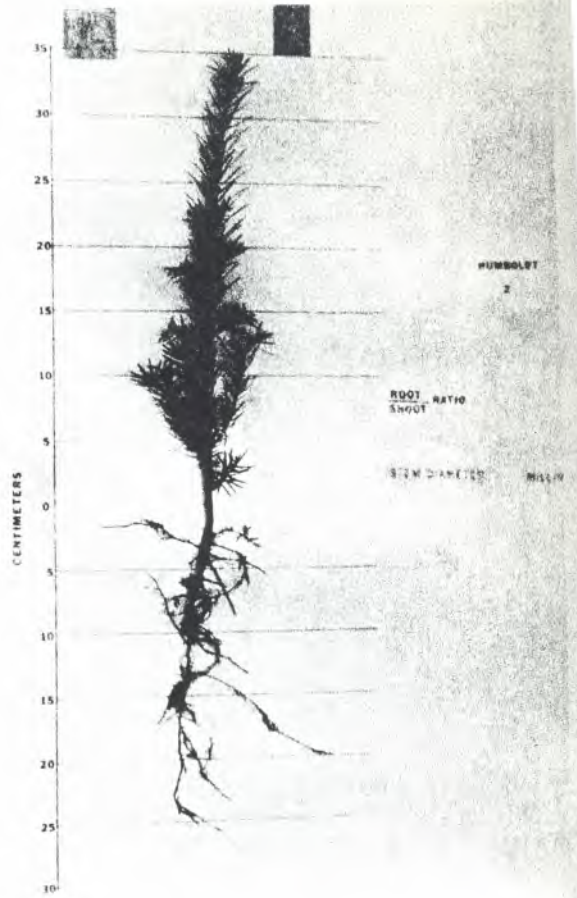
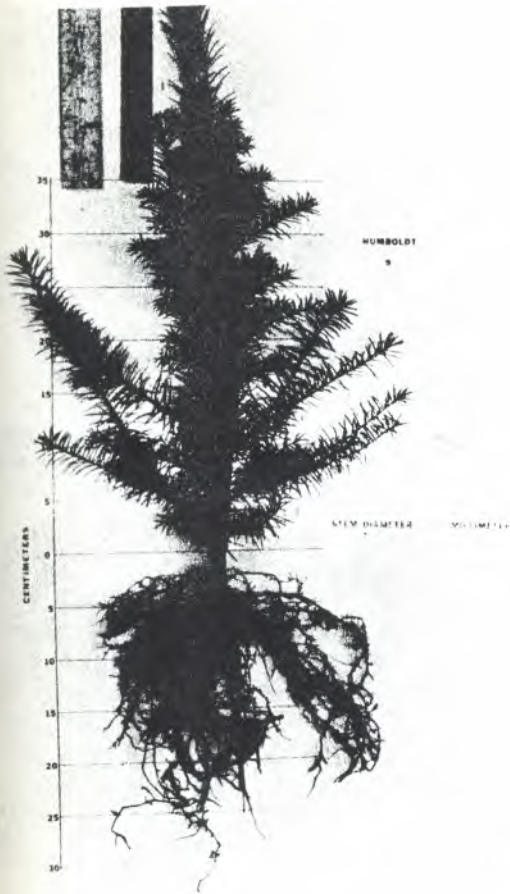
Species	Standard Deviation For			
	<u>1-0</u>	<u>2-0</u>	<u>3-0</u>	<u>2-1</u>
Douglas fir	3	4	5	5
Sitka spruce	3	4	5	5
Ponderosa pine	2	3	3	3
Jeffery pine	2	3	3	3
Sugar pine	2	3	3	
Noble fir		4	5	
Grand fir		4	5	
Shasta fir		4	5	

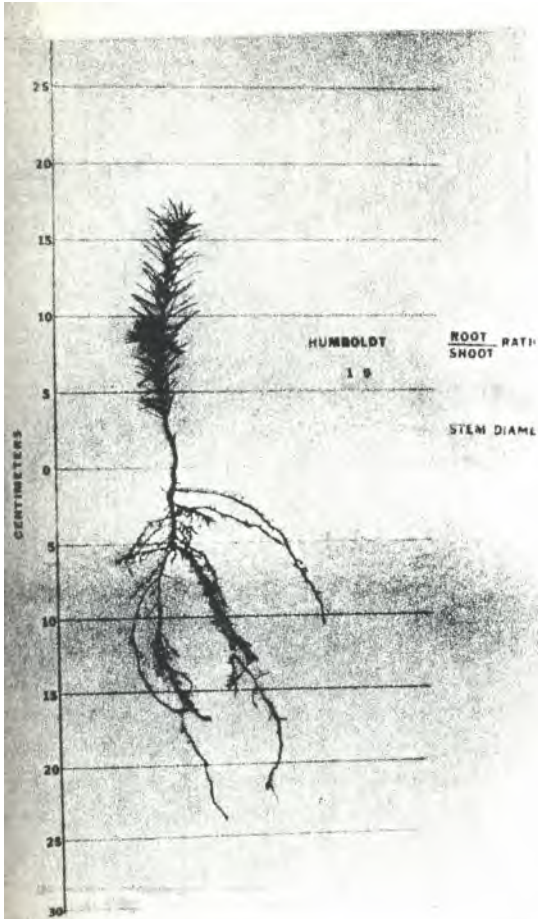
## ENCLOSURE 3

# Trees Sampled	Seedlot Code	Tree Seedling Size Class, Code	Average		Height Range cm	Dia Range mm	% within + or - 25% of Average Ht.	% within + or - one mm of Average
			Ht (cm)	Dia (mm)				
23	205-11-072-050-1.5	B-33-04-Ø-745	32.6	3.8	26-44	2-6	91	91
148	205-11-072-050-2.0	B-30-04-Ø-745	30.4	4.3	10-56	1-8	73	76
109	205-11-072-050-2.5	B-35-05-Ø-745	34.7	5.0	21-58	3-13	82	80
49	205-11-072-050-3.0	B-33-06-Ø-745	32.5	6.2	21-51	4-14	82	82
42	205-11-081-020-2.5	B-32-06-Ø-745	31.5	6.4	24-50	4-9	90	76
59	205-11-081-020-3.0	B-37-06-Ø-745	36.8	5.7	22-59	4-10	83	71
33	205-11-081-020-4.0	B-38-06-Ø-745	37.9	6.2	24-53	3-11	82	79
19	205-11-081-030-1.0	B-31-04-Ø-745	30.9	3.8	18-44	2-6	37	79
53	205-11-081-030-1.5	B-30-03-Ø-745	29.6	3.2	16-44	1-6	83	88
37	205-11-081-030-2.0	B-37-04-Ø-745	36.9	4.5	26-52	2-7	92	84
34	205-11-081-030-3.0	B-32-05-Ø-745	32.2	4.8	16-60	2-8	79	68
138	205-11-082-010-2.0	B-40-04-Ø-745	40.0	4.1	16-62	1-8	88	84
55	205-11-082-010-3.0	B-42-06-Ø-745	41.7	5.7	24-65	3-8	94	64
20	205-11-082-010-3.5	B-37-05-Ø-745	36.5	4.8	23-50	3-7	70	90
500	205-11-082-011-1.5	B-39-06-Ø-745	38.6	5.9	12-78	2-16	45	30
43	205-11-511-020-2.0	B-34-05-Ø-745	34.1	5.4	26-46	3-11	98	65
40	205-11-511-020-2.5	B-34-06-Ø-745	34.2	6.0	26-50	4-9	90	78
32	205-11-511-020-3.0	B-29-06-Ø-745	29.2	6.1	18-39	5-8	81	94
22	205-11-511-020-4.0	B-32-06-Ø-745	31.5	6.0	26-42	4-9	95	86
53	205-11-512-020-2.5	B-31-06-Ø-745	30.5	6.3	22-50	4-9	89	79
104	205-11-512-020-3.0	B-34-04-Ø-745	34.1	4.4	21-55	3-7	81	86
15	205-11-512-020-3.5	B-27-05-Ø-745	27.0	5.5	22-34	4-6	100	100
19	205-11-512-020-4.0	B-22-05-Ø-745	22.3	5.2	17-30	4-8	95	95
27	205-11-512-040-2.5	B-37-06-Ø-745	36.7	5.9	24-54	3-8	66	61
101	205-11-512-040-4.5	B-30-05-Ø-745	30.0	4.8	17-46	2-7	92	86
122	205-11-512-041-3.5	B-32-05-Ø-745	31.6	5.2	15-43	2-8	79	70
20	205-11-512-046-4.0	B-35-05-Ø-745	34.9	5.2	27-46	3-8	90	80
76	205-11-512-046-5.0	B-29-05-Ø-745	29.2	5.3	12-40	3-7	87	86
212	205-12-053-010-1.0	B-28-06-Ø-745	27.6	5.6	15-48	3-13	79	74
160	205-12-053-010-1.5	B-24-04-Ø-745	24.2	3.9	11-35	2-7	81	88

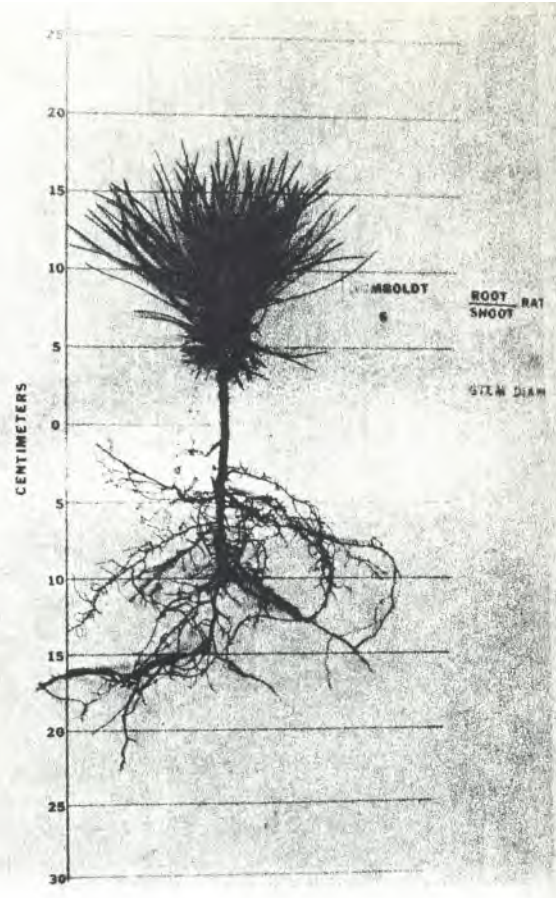
# Trees Sampled	Seedlot Code	Tree Seedling Size Class, Code	Average		Height Range cm	Dia Range mm	% within + or - 25% of Average Ht.	% within + or - one mm of Average
			Ht (cm)	Dia (mm)				
212	205-12-061-035-1.0	B-30-05-Ø-745	29.6	4.8	10-55	1-8	82	74
225	205-12-061-035-1.5	B-29-04-Ø-745	28.7	4.2	16-44	2-7	77	91
260	205-12-061-050-0.5	B-18-03-Ø-745	18.2	3.0	4-39	1-6	60	93
307	205-12-061-050-1.0	B-22-04-Ø-745	21.6	4.3	6-39	1-9	82	79
229	205-12-061-050-1.5	B-29-04-Ø-745	29.3	4.3	29-46	2-7	78	89
149	205-12-062-020-0.5	B-34-05-Ø-745	33.5	5.2	16-52	3-8	85	85
248	205-12-062-020-1.0	B-29-05-Ø-745	29.4	5.4	9-49	2-12	75	77
113	205-12-062-020-1.5	B-26-04-Ø-745	26.4	4.2	14-43	2-7	70	81
114	205-12-062-020-2.0	B-26-04-Ø-745	26.4	4.4	6-45	2-7	55	81
145	205-12-062-040-0.5	B-32-06-Ø-745	31.8	6.2	16-50	3-10	86	72
293	205-12-062-040-1.0	B-23-04-Ø-745	23.4	3.9	6-57	1-10	60	78
97	205-12-062-040-2.0	B-32-04-Ø-745	32.4	4.4	15-50	2-7	71	72
40	205-15-591-045-3.0	B-33-05-Ø-745	32.7	5.4	25-40	1-7	100	85
43	205-15-491-040-3.5	B-40-05-Ø-745	39.7	4.8	25-53	2-7	81	88
77	205-15-491-040-2.5	B-41-05-Ø-745	40.5	5.4	26-63	3-8	88	81
24	205-15-491-040-2.0	B-35-05-Ø-745	35.3	4.8	21-53	3-8	63	79



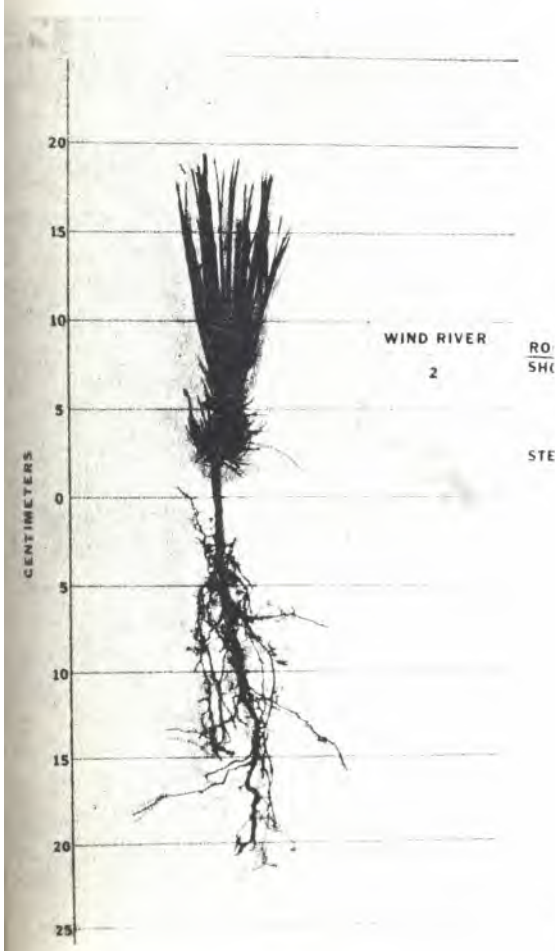




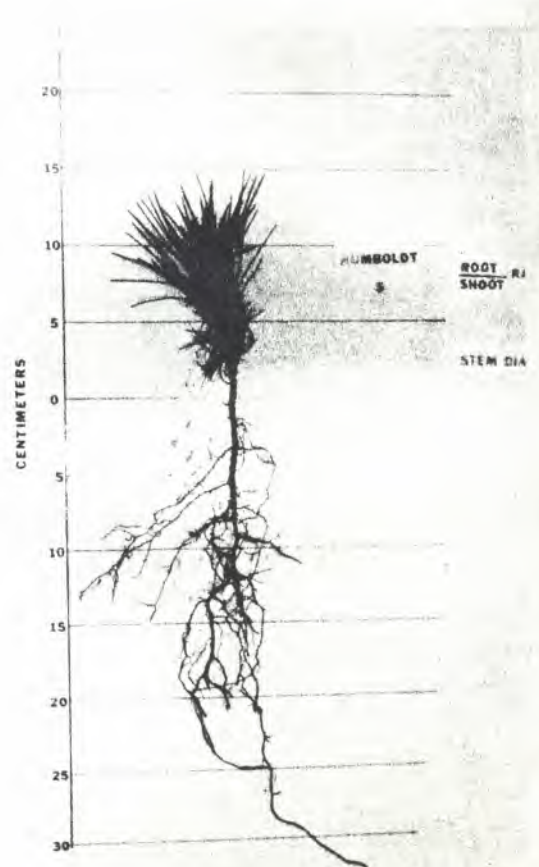
5



6

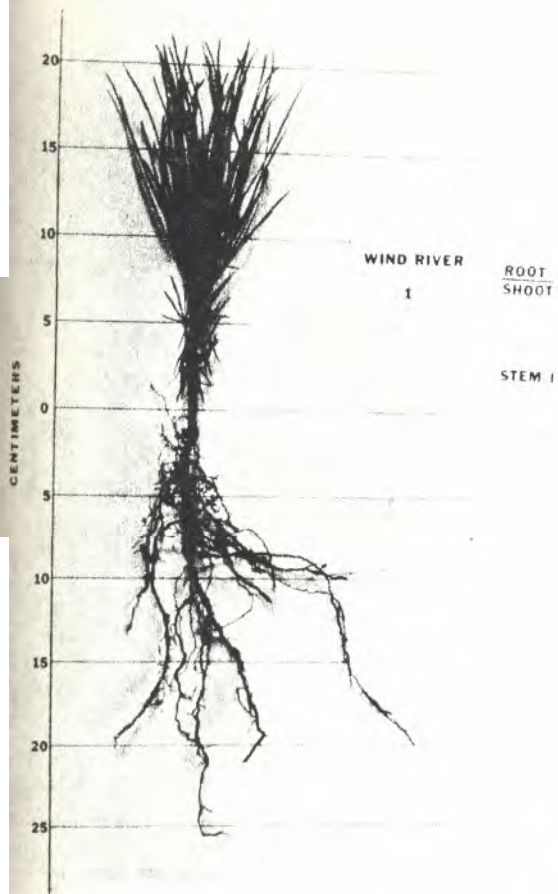


7

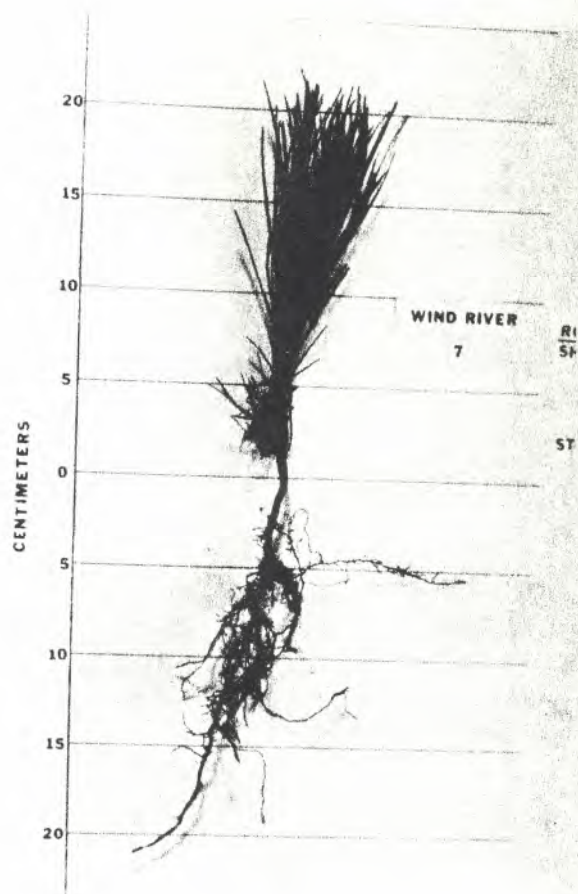


8





9



10