

THE PRODUCTION OF CONIFEROUS TRANSPLANTS
USING SPENCER LEMAIRE CONTAINERS

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At the Alberta Tree Nursery and Horticulture Centre planting stock is produced for shelterbelts. Coniferous stock is produced to a volume of 720,000 transplants which is 20% of our total annual production. Colorado spruce, white spruce, norway spruce, lodgepole pine and scots pine species are involved.

The Alberta Tree Nursery started its production in 1950. During the first 20 years of operation, coniferous transplants were produced in the conventional manner as a 3-3. The seed was row seeded in framed seedbeds. Seeds were covered with sand, snowfence was used to provide shade. After 3 years the seedling was harvested and transplanted. Often these 6 year old transplants (3-3) showed the "hockey stick" root deformation as a result of the transplanting system used.

About 10 years ago a change was made in this production line. The Spencer Lemaire Container has replaced the seedbed production for the 3-0 plant. The Spencer Lemaire Container is a container model, developed in Alberta. The history of the development and the merits of this container were dealt with in the 1981 meeting of this nurserymen's group in Edmonton, Alberta.

For production of shelterbelt coniferous seedlings we use the 37 cubic centimeters container. 102 of these containers fit in a tray 22 cm x 35 cm. Seeding is carried out the first half of September and the greenhouses are loaded October 15th. Seeding is done by hand 2 - 4 seeds per cavity. The number of seeds used depends on the germination % of the seed. Seeds are not stratified. The growing medium in the container is per attached addendum. The trays are covered with poly until germination is well advanced. Subsequent thinning and transplanting follows to assure a 100% crop per cavity. The addendum exhibits the growing schedule in the greenhouse, based on a total of 28 weeks. Amount and frequency of fertilizer applied is documented in the attached addendum.

By May 15th the dormant crop is moved into the shade frames. By this time the height of the plants is around:

5 cm for colorado spruce
10 cm for white spruce 15
cm for pine

Daily watering and fertilizing is maintained in the lathhouse, until the plants are transplanted in August. Additional growth will start around July 1st. The lathhouses are shaded with saran

cloth which reduces light intensity to about 70% of normal light exposure.

Before transplanting the plants are taken out of the containers and placed in flats. Transplanting starts August 15th and is preferably completed by September 15th. We use 4 transplant units per transplant machine which is pulled by a tractor with creeper gear. Transplant spacing is 46 cm between rows and an average 10 cm in the row between plants. This gives us 215,000 seedlings per Ha. Immediately after planting the seedlings are sprayed with linuron 50W at a rate of 2.24 Kg active ingredient per Ha. Sprinkler irrigation will start after this depending on weather conditions. The seedlings develop a root system during the fall and by the middle of November are well established. The following spring the transplant fields are again sprayed with linuron at the same rate. The emerging annual weeds such as stinkweed are easily controlled. Handweeding is as a rule required only once during the first growing season. In the following two years linuron is applied in the spring, before dormancy breaks at the rates given before.

The 3 year old transplants are harvested in the spring. The original root formation from the containers is still visible. An Edgedahl undercutter is used to shake the plants loose. The plants are gathered up and placed in containers for transport to the grading tables. Here the 4 year old plants are bundled in 10. This is the final coniferous product of the Alberta Tree Nursery. The plant material is wrapped in poly with peatmoss added and the parcel is again wrapped in burlap.

These young trees which we identify as lc-3 become the backbone of many farmstead shelterbelts throughout Alberta.

GROWING MEDIUM FOR CONIFEROUS CONTAINERS

CONIFEROUS/CU. YARD

Peat Moss	75% = 4 1/2 - 4 cu. ft. bags
Vermiculite	15% = 1 1/5 - 4 cu. ft. bags
Perlite	10% = 4/5 - 7 Kg. bag

ADD

Dolomite Lime	2 lbs. = .9 Kg.
Gypsum	3.5 lbs. = 1.6 Kg.
Superphosphate - 0-18-0	3 lbs. = 1.3 Kg.
Potassium Nitrate - 12-0-44	12 oz. = .34 Kg.
Calcium Nitrate - 15-5-0	12 oz. = .34 Kg.
Fritted Trace Elements	2 oz. = .06 Kg.
Iron Chelate	2.5 oz. = .07 Kg.

CROP 1/82 - OCTOBER 15 - APRIL 30

WEEK	DATE	TEMPERATURE IN G.H.	LIGHTS	HUMIDITY	FERTILIZER	COMMENTS
Germination up to 14 days		18°C=65°F	natural	80%	n/a	
1	18/10/81	18°C	natural	80%	n/a	
2	25/10/81	24°C-21°C	22	80%	10-52-10	- Watering 2 times daily - 10 min. ea
3	2/12/81		22	80%		Fertilizer added during second
4	9/12/81		22	80%		watering 3x/week.
5.	16/12/81	24°C-18°C	20	80%	28-14-14	- Thinning & Trans- planting commences
6.	23/12/81	24°C-18°C	20	80%	28-14-14	
7.	30/12/81	24°C-18°C	20	80%	28-14-14	
8.	6/01/82	24°C-18°C	20	80%	28-14-14	
9.	13/01/82	24°C-18°C	18	80%	28-14-14	4:1 Ratio
					20-20-20	
10.	20/01/82	24°C-18°C	18	80%	28-14-14	4:1 Ratio
					20-20-20	
11.	27/01/82	24°C-18°C	18	80%	28-14-14	4:1 Ratio
					20-20-20	
12.		24°C-18°C	18	80%	28-14-14	4:1 Ratio
					20-20-20	
13.		18°C-13°C	18	60%	28-14-14	
14.		18°C-13°C	18	60%	28-14-14	
15.		18°C-13°C	18	60%	28-14-14	
16.		18°C-13°C	18	60%	28-14-14	
17.		16°C-10°C	18	50%	10-52-10	Water & Fertilizer
18.		16°C-10°C	18	50%	10-52-10	2 time/ week
19.		16°C-10°C	18	50%	10-52-10	
20.		16°C-10°C	18	50%	10-52-10	
21.		13°C-7°C	14	30%	10-52-10	
22.		13°C-7°C	14	30%	10-52-10	
23.		13°C-7°C	14	30%	10-52-10	
24.		13°C-7°C	14	30%	10-52-10	
25.		7°C-2°C	natural	20%	n/a	
26.		7°C-2°C	natural	20%	n/a	
27.		7°C-2°C	natural	20%	n/a	
28.		7°C-2°C	natural	20%	n/a	

FERTILIZER - GREENHOUSES

1:100 Ratio Injector System

Nitrogen

10-52-10	- 32 lb. per 45 gallon barrel	(1 lb. = 2 cups)	80 p.p.m.
28-14-14	- 24 lb. per 45 gallon barre	(1 lb. = 2 1/2 cups)	200 p.p.m.
20-20-20		(1 lb. = 2 1/2 cups)	20 p.p.m.

4 Weeks = 34" Full	3 Weeks = 25 1/2" 3/4	2 Weeks = 17" 1/2	1 Week = 8 1/2" 1/4
(a) <u>10-52-10</u> 80 ppm 32 lb. = 64 cups	24 lb. = 48 cups	16 lb. = 32 cups	8 lb. = 16 cups
(b) <u>28-14-14</u> 200 ppm 24 lb. = 60 cups 33 lb. = 82 1/2 cups	18 lb. = 45 cups	12 lb. = 30 cups	6 lb. = 15 cups
(c) <u>28-14-14</u> plus 12 lb. = 30 cups <u>10-52-10</u> 80 ppm 16 lb. = 32 cups	<u>1:1 Ratio</u> 9 lb. = 22 1/2 cups 12 lb. = 24 cups	6 lb. = 15 cups 8 lb. = 16 cups	3 lb. = 7 1/2 cup 4 lb. = 8 cups
(d) <u>28-14-14</u> plus 24 lb. = 60 cups <u>20-20-20</u> 20 ppm 6 lb. = 15 cups	<u>4:1 Ratio</u> 18 lb. = 45 cups 4 1/2 lb. = 11 1/4 cups	12 lb. = 30 cups 3 lb. = 7 1/2 cups	6 lb. = 15 cups 1 1/2 lb. = 3 3/4 cups