THE STATUS OF CONTAINER PLANTING PROGRAMS IN CANADA

6. QUEBEC

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Abstract.--In the past few years Quebec has developed an ambitious reforestation program which aims at supplying high-quality forest products to the forest industry within 40-50 years. This program will involve the planting of some 90 million trees annually on private and Crown lands by 1985. Of this figure, 20 million containerized seedlings will be grown at six nurseries, sufficient to replant 8,000 ha annually. As part of this program the Ministe-e de l'Energie et des Ressources has developed its own container system.

Résumé--Au cours des dernières années, le Québec a mis en marche un ambitieux programme de restauration forestière visant à fournir à l'industrie forestière, d'ici 40 à 50 ans, des produits de haute qualité. D'ici 1985, on plantera annuellement 90 millions d'arbres sur les terres domaniales et les terres privées. Parmi ceux-ci, il y aura 20 millions de plants en mottes emballées provenant de six pépinières, assez pour replanter une superficie de 8,000 ha chaque année. Pour ce programme, le Ministère de l'Énergie et des Ressources a mis au point son propre système d'emballage.

INTRODUCTION

At the present time, the Ministere de l'Energie et des Ressources de Quebec (MERQ) is responsible for almost all reforestation programs carried out in the province. The forest industry may, however, become more involved in the intensive management of our forests in the near future. Agreements are now being negotiated between representatives of the forest industry and the government of Quebec. Reforestation programs initiated by the forest industry to date have been carried out exclusively on company freehold.

CURRENT REFORESTATION POLICY AND THE ROLE OF CONTAINERIZED TREE SEEDLINGS

In 1979, under a federal-provincial agreement, MERQ instituted a development policy for the pulp and paper industry with a view to improving that industry's competitive position, especially on the North American market. One facet of this policy is intensive forest management, which aims, in the long term, at bringing the forest closer to the mills. This intensive management program will involve the planting of some 90 million seedlings annually on private and Crown lands throughout the province by 1985. Of this total, 20 million seedlings, or more than 20% of total production, will be grown in containers. Current and future reforestation by stock type and organization are summarized in Table 1. (An average planting density of 2,500 seedlings per ha is assumed.)

Under MERQ's own reforestation program, 16,000 ha of private land and 20,000 ha of Crown land will be planted annually by 1985. Forest industry planting will account for a further 2,000 ha in 1985. It should be noted that the entire production of containerized seedlings will be planted on Crown lands.

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Table 1. Current and forecast planting program by organization and stock type.

Agency	Stock type	1980 (ha)	1983 (ha)	1985 (ha)
Ministère de l'Énergie et des Ressources de Québec (MERQ)	bare-root	13,200	20,000	28,000
	container	--	3,200	8,000
	total	13,200	23,200	36,000
Canadian International Paper Company (CIP)	bare-root	153	240	40
	container	628	1,435	1,800
	total	781	1,675	1,840
Consolidated-Bathurst Inc. (CB)	bare-root	10	--	--
	container	160	160	160
	total	170	160	160
Grand total	bare-root	13,363	20,240	28,040
	container	788	4,795	9,960
	total	14,151	25,035	38,000

PRODUCTION STATISTICS

Large-scale container production of containerized seedlings is a relatively recent development in Quebec. In fact, in both the public and private sectors, the production of this type of seedling is still in its early stages, as can be seen in Table 2. However, MERQ has been operating an experimental nursery since 1970, while the Consolidated-Bathurst Inc. (CB) and Canadian International Paper Company (CIP) have operated nurseries since 1974 and 1979, respectively.

Table 2. Current and forecast production of containerized seedlings by agency.

Agency	Type of greenhouse	1980	1983	1985
		(000,000)		
MERQ	heated	0.2	8.0	8.0
	partially heated	--	--	12.0
CIP	heated	1.4	3.0	3.0[a]
CB	heated	0.3	0.3	0.3
Total	heated	1.9	11.3	11.3
	partially heated	--	--	12.0

[a]Includes 500,000 seedlings to be produced at Dalhousie, N.B. and planted in Quebec.

It is clear that MERQ's production of containerized seedlings will be increased considerably by 1985. Unless other factors intervene, production in that year will account for 90% of all containerized planting stock produced in Quebec. Seedlings will be grown either by MERQ itself or by private nurseries under contract. To reduce production costs MERQ is studying the feasibility of growing more than 50% (12 million) of these seedlings entirely outdoors on a 2-year production cycle.

CIP estimates that it will double its production by 1983 to meet its own needs, while CB will maintain its production at the present level.

At present, four nurseries are producing containerized seedlings in Quebec. Two of these, with a combined growing area of 9,988 m^2, began production of planting stock for MERQ use in January 1981. One, operated by MERQ at East Angus in the Eastern Townships, has an annual production capacity of 3 million seedlings. Both nurseries are scheduled to produce two crops annually.

The other two nurseries are operated by CIP and CB, and have growing areas of 1,060 m^2 and 23 m^2, respectively. CIP grows three crops annually for a total of 1.4 million seedlings, while CB grows only two crops per year (300,000 seedlings).

CONTAINER TYPES AND SPECIES

Four container types are being used in Quebec this year. At East Angus, MERQ is using a paper container produced by a completely automated filling and sowing machine. All operations are carried out by the machine, from mixing of peat to packaging of filled containers. The machine produces approximately 10,000 filled cavities per hour. The container produces a growth environment which compares favorably with that of other containers on the market. The volume of the container is approximately 115 cm^3. This machine was developed by the Centre de Recherche Industrielle de Quebec (CRIQ) at MERQ's request. CRIQ undertook the development work in 1975 and completed it in 1980. The container now used is made of ordinary paper covered by a thin internal layer of polyethylene. This paper must be removed when the seedling is planted. Research is under way at the pulp and paper research centre of the University of Quebec at Trois Rivieres to develop a biodegradable paper. CRIQ also hopes to develop, in the next few months, a system of vertical ribs inside the container to minimize root development problems.

MERQ decided to develop a paper container in 1974, since it was extremely difficult to obtain sufficient Japanese paperpots at that time, and problems were anticipated with breakdown of the paper in the soil. Another problem was the constantly increasing cost of containers made from oil-based products. Moreover, more seedlings can be grown per square metre of greenhouse space when paper containers are used rather than styroblock containers, transportation costs for the seedlings are lower, and it is possible to eliminate some handling upon delivery.

The first crop of 3 million jack pine *(Pinus banksiana* Lamb.) seedlings was planted in June, 1981. Next year we plan to produce black spruce *(Picea mariana* [Mill.] B.S.P.) in the MERQ container. Within the next two or three years, we hope to acquire considerable expertise in operational techniques with this container system.

Since our system is still in its early stages, we have had to use other types of container for the growing contract signed with a private company in 1980. The styroblock was chosen for this contract, mainly because it is available in various sizes. We have used styroblock-8s for black spruce and we plan to use styroblock-4s for jack pine.

A more durable container, such as the Can-Am multipot, would have been preferred had it been available in 1980 in a size equivalent to that of the styroblock-8. The larger multipot may well be used in the future. However, these containers will be used on a temporary basis, since over the long term all our container production will be carried out with our own system.

CIP currently uses the styroblock and Can-Am multipots; the latter is sturdier and more resistant to handling damage. CIP uses styroblock-4s for species produced during winter and styroblock-2As for species produced during summer. Jack pine (85%) and black spruce (10%) are the main species produced by CIP.

CB has used the FH 408 paperpot since 1974 and sees no major reason for changing. Survival rates are said to be greater than 85%; seedling growth is good and the cost is acceptable. Moreover, CB feels that transportation, handling and planting of the seedlings are easier with the paperpot system than with the other systems. The main species produced by CB are black spruce (50%), jack pine (40%) and European larch *(Larix decidua [Mill.])* (10%).

MANAGEMENT OBJECTIVES

There are many reasons for the increased use of containerized tree seedlings in reforestation programs in Quebec, and these vary according to the agency involved.

MERQ intends to use all of its container production, or 20 million seedlings, on Crown land. Seventy percent of its reforestation program on these Crown lands is concentrated in three administrative regions, and containerized seedlings will be used mainly to extend the planting season in these regions, and thereby provide more flexibility in its reforestation operations. Bare-root stock generally must be planted between 15 May and 15 June for the best results. The use of containerized seedlings will permit MERQ to extend this period by about one month, depending on weather conditions during the planting season in the regions concerned.

MERQ's other objectives in using containerized seedlings are as follows:

1) to reduce manpower requirements and planting costs (With containerized seedlings a planter can almost double his productivity over that with bare-root stock.)

2) to improve planter motivation (Since the use of containerized seedlings

makes it possible to extend the planting season, it is much easier to motivate and educate workers so that quality work is obtained in the planting of the two types of seedlings.)

3) to develop automated systems, since the size of the container is standard and the root system is protected.

The objectives of forest products companies are almost identical to those of MERQ. Moreover, it is felt that the use of containerized seedlings will make it possible to extend the production period to nine months and monitor the growth of seedlings better. It will also simplify the task of supervising workers during the planting operation.

GENERAL COMMENTS

Containerized tree seedlings are becoming more and more popular in North America, especially in Canada and the northern United States. It seems clear that this type of seedling will create many opportunities for the development of new production and planting techniques. However, on the basis of our present knowledge, we believe that bare-root stock is still very useful in reforestation programs. Each type of seedling has advantages and disadvantages, and the best system, in our opinion, involves a judicious use of both types. In its policy, MERQ emphasizes reforestation of the best sites. Both seedling types must therefore be used, depending upon land conditions in the areas to be reforested, so that our final objective, to supply the required amount of wood within the time allowed, may be achieved.

As a result of various tests conducted by MERQ over the past several years we feel that a containerized seedling, regardless of container type, must meet minimum quality criteria, including those concerned with morphological characteristics of the seedlings. We are currently specifying a shoot height of at least 15 cm, a root-collar diameter of 2.5 mm for jack pine and 3.0 mm for spruce, with a dry weight shoot:root ratio of less than 3.0. Although production costs for a seedling of this size are high, we believe that the extra investment required (over that for a smaller seedling) will be amply compensated by an increased survival and growth rate. The containerized tree seedling is, however, smaller than the bare-root seedling and it should therefore be used only on sites where the competition from grass or shrubs is less severe.

It should not be forgotten that large investments are required for the reforestation of cutover land. There are several stages in this operation which must be attended to, from the production of seedlings to the maintenance of reforested areas. Each of these stages is a link in a chain which is no stronger than its weakest link. At the present time, MERQ's reforestation program emphasizes quality in all its operational stages, so that a maximum amount of wood may be produced in a minimum of time.

CONCLUSION

Quebec has, over the past few years, developed an ambitious reforestation program which aims at supplying high-quality forest resources to the forest industry in 40 or 50 years. In the area of container production, we have chosen to develop our own system for the reasons outlined above. In view of the knowledge we have of containerized seedling production at the present time, MERQ has made a prudent compromise with respect to the type of seedling production it will use. Within the next few years we should be able to acquire considerable expertise in the area of containerized tree seedlings and we will be in a position to re-evaluate the situation in the light of this increased knowledge.

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