# THE STATUS OF CONTAINER PLANTING PROGRAMS IN THE NORTHERN UNITED STATES

## 2. LAKE STATES--MINNESOTA, WISCONSIN, MICHIGAN

Alvin A. Alml

Abstract.--About 6 million containerized seedlings were grown in the Lake States in 1981. Container stock was planted on about 2,500 ha or about 8% of the area planted with bare-root seedlings. Reforestation programs will increase by 1983 but the percentage of container use will remain nearly constant. The primary objectives of use are to meet planting stock shortages and to extend the planting season.

Résumé.--Quelque 6 millions de semis en récipients ont été cultivés dans les états des Grands Lacs en 1981. Des récipients ont été plantés sur 2500 ha, soit 8% de la superficie plantée de semis à racines nues. Les programmes de reboisement augmenteront d'ici 1983, mais le pourcentage d'utilisation de récipients demeurera presque constant. Les objectifs principaux sont de répondre à la pénurie de semis de plantation et de prolonger la saison de plantage.

## INTRODUCTION

Container plantings in the Lake States were begun with Ontario tubes in 1967 as part of a Minnesota research program. Research has continued with other types of container stock planted under a range of conditions on which various site preparation techniques have been applied. In Michigan a related research program is concerned with development of accelerated optimal growth (AOG) seedlings cultured in greenhouses. These research programs have demonstrated the feasibility of using containerized seedlings in operational plantings. However, container planting did not become operational in the Lake States until 1977 when Potlatch Corporation of Cloquet, Minnesota constructed its first containerized seedling greenhouse. This greenhouse has since been expanded to four times its original size. It was followed by construction of a container greenhouse at Rhinelander, Wisconsin in 1978 by Consolidated Papers, Inc. This company has since supplemented its greenhouse with a shade house to expand production. In 1979, Mead Paper built its container greenhouse at Escanaba, Michigan.

[1]Professor, College of Forestry, University of Minnesota, St. Paul, Minnesota.

## 1981 CONTAINER PRODUCTION

The three forest industry greenhouses mentioned above produced about 3.26 million seedlings in 1981 in two crops (Table 1). This was about 58% of the 5.6 million total production of container seedlings for 1981 in the Lake States. An additional 1.91 million or about 34% were produced by two commercial greenhouse operations in Minnesota. These were sold to forest industries and to public forestry agencies. The remaining seedlings produced for operational programs in the Lake States were grown in small public agency greenhouses. In addition, there is a commercial greenhouse in Michigan that grows about 850,000 seedlings annually in containers, but these are primarily for purposes other than reforestation.

About 80% of the seedlings produced in the Lake States were grown in styroblocks, mostly styroblock-2s. Producers maintained that they selected this system because it was economically competitive and efficient to use. Research results and the experience of other producers were also important in their selection decision. The Mead Paper greenhouse in Michigan uses Spencer-Lemaire "Root-rainer 5s", primarily because more seedlings

Table 1. Containerized seedling production plus area planted in 1981 and projected for 1983, by agency, in the Lake States.

| | Forest industry[a] | Federal agencies[b] | State and county | Other private[c] | Commercial greenhouses | Total |
|---|---|---|---|---|---|---|
| Heated greenhouse area ($m^2$) | 2,449 | 398 | 37 | 0 | 2,360 | 5,244 |
| Seedling production | | | | | | |
| 1981 (000) | 3,260 | 407 | 25 | 0 | 1,910 | 5,602 |
| 1983 (000) | 3,800 | 800 | 330 | 0 | 1,610 | 6,540 |
| Area planted in 1981 | | | | | | |
| Containers (ha) | 1,728 | 630 | 138 | 0 | - | 2,496 |
| Bare-root (ha) | 2,051 | 4,629 | 5,900 | 19,535 | - | 32,115 |
| Planting target for 1983 | | | | | | |
| Containers (ha) | 2,448 | 656 | 398 | 0 | - | 3,502 |
| Bare-root (ha) | 2,226 | 5,511 | 9,314 | 25,990 | - | 43,041 |

[a]Includes only industries that used both containers and bare-root stock in 1981.
[b]USDA Forest Service and Bureau of Indian Affairs.
[c]Includes industries with no container program in 1981 and nonindustrial private landowners.

can be grown per square metre with this system. A greenhouse operated by the Bureau of Indian Affairs at Redby, Minnesota uses the FH 315 paperpot system because of the "package" features. It also notes the advantage of not having to bring anything back from the field to clean up.

About 60% of the containerized seedlings grown in the Lake States in 1981 were red pine *(Pinus resinosa* Ait.). White spruce *(Picea glauca* [Moench] Voss) and black spruce *(P. mariana* [Mill.] B.S.P.) made up an additional 26%. The remainder were equally divided among jack pine *(Pinus banksiana* Lamb.), white pine *(P. strobus* L.) and miscellaneous species. There is increasing interest in the Lake States in the use of exotic and hybrid larches *(Larix* spp.), which made up the bulk of the miscellaneous total.

## PLANTING PROGRAMS

About 34,610 ha of land in the Lake States were planted for reforestation purposes in 1981. Containerized seedlings comprised about 7% of this planting. Nearly 56% of the total area planted or about 19,535 ha was in private ownership. (The total figure includes plantings by forest industries that used no containers in 1981.) The forest industries that had both container and bare-root programs planted 3,779 ha or about 10% of the total. Other public agencies planted the remainder: federal, 5,259 ha and state and county, 6,038 ha.

Much of the planting in the Lake States is done by hand planting crews from the southern United States. These crews operate as contractors on a bid basis. They are well trained, experienced planters and commonly average 3,000 to 4,000 trees per 8-hr day. The favored planting tool seems to be the hoedad for both container and bare-root stock but planting tubes such as the Pottiputki are also used. Planting machines are used in the Lake States area where terrain and site conditions permit.

A variety of mechanical site preparation techniques are being used for container planting sites. The most common ones are disking, spot scalping with equipment such as the Leno and Bräcke scarifiers, and the use of various V-blades and plows. Roller chopping has been tried and most recently the TTS disk trencher has been used. There is also a considerable amount of site conversion, and this usually requires shearing or grubbing with the debris raked into windrows. The mechanical work is often accompanied by herbicide application either before or after planting. But there is a real need for more information on the use of herbicides with containerized seedlings.

## REASONS FOR CONTAINER USE

The major reason given by agencies in the Lake States for using containerized seedlings relates to the shortage of bare-root nursery stock. This shortage is a result of the recent years of drought which have

affected nursery production. In addition, reforestation programs have been accelerated in recent years. A second reason given by these agencies was the realization that containers add flexibility to planting programs. Container users are able to extend the normal planting season into the summer months. They also have additional flexibility in that they can cut down on production lead time and shorten the interval between harvesting and reforestation. They can also schedule planting when moisture conditions in the field are near optimum. The third most frequently cited reason was the opportunity containers provided for the more efficient use of genetically improved seed. This consideration will likely become more important in the future as tree improvement programs expand and seed orchards begin seed production.

In general, container users are pleased with survival and growth results achieved to date. There have been failures with containers in the Lake States, but many of these have been the result of poor seedling quality or inadequate site preparation. More information is needed about site prescription relating conditions to selection of site preparation method and type of seedling. However, before this can be accomplished, specifications will have to be developed so that the size and condition of container-grown seedlings can be better described.

## FUTURE TRENDS

Reforestation programs will continue to expand in the Lake States in the immediate future. It is projected that the area of land reforested by planting will increase by about 35% between 1981 and 1983. About 8% of the total area planted in 1983 will be planted to container stock (i.e., nearly the same percentage as in 1981). Most of the additional container-grown seedlings will be planted by the three forest industries which operated container greenhouses in 1981.

Even though research programs have been under way for a number of years, operational container use is still in its infancy in the Lake States. Most of the early use has been in Minnesota. Planting of containerized seedlings in that state accounted for about 58% of the 1981 total planted in the Lake States.

To date, the only operational container programs by public agencies have been in Minnesota. Several counties are involved in container planting, and in 1981 there were relatively large plantings in both national forests in Minnesota. The Minnesota Department of Natural Resources also started a container planting program in 1981. Nearly all of the container seedlings used by these agencies were grown by the two commercial container greenhouses in the state.

The Bureau of Indian Affairs in Minnesota has been operating its container greenhouse on the Red Lake Reservation for several years and will double production by 1983. Containerized seedlings have also been tested in Minnesota for mineland reclamation plantings. They have the advantage of being easier to plant on difficult sites, and survival has been good. The Iron Range Resources Commission in Minnesota is currently constructing a greenhouse facility for producing container stock. Erie Mining Company has also had some container trials and is interested in additional plantings.

Container planting programs have not grown as rapidly in Wisconsin and Michigan as in Minnesota. This may be a result of Minnesota's research program which has been conducted in cooperation with the various forestry agencies. However, both state and federal organizations in Wisconsin and Michigan have indicated a strong interest in the use of containerized seedlings and may initiate programs in the future, depending on budgets and demand for planting stock.

It is likely that container use in the Lake States will continue to expand. This expansion will take place as more information becomes available, particularly that relating to survival and growth of the plantings now being established. The growth rate will also depend on whether or not the production of bare-root nursery seedlings can keep pace with the acceleration of planting programs in the Lake States. The continued recognition of the advantages that containerized seedlings offer in extending the normal planting season will be a key factor.

The author would like to express his sincere appreciation to the many cooperators who supplied data and information for this paper.