CONTAINER PLANTING

by

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The use of containers for the transportation of trees is not a new concept. Records indicate their use dates back at least 4,500 years. We have been using containers for many years to transport nursery stock. These containers being bags, boxes, open-end bales or whatever, give no protection to the trees during or after planting.

Today we are considering individual seedlings growing in containers which hopefully should permit the normal continuance of metabolic processes of the seedling from nursery bed to the forest soil. After testing many types of containers, prior to 1968 we settled on a tapered linerboard container with a volume of 40 cubic inches. The linerboard is now being replaced by a styrofoam container which has the same external dimensions.

SLIDE 1. Small seedlings can be grown from seed in small capsules, but a larger one is needed for potting bareroot seedling from the nursery.

They cannot, after planting, obstruct root growth or moisture transfer.

Container cost must be kept as low as possible. This is why we have shifted from linerboard to styrofoam.

SLIDE 2. Resin--impregnation and manufacturing problems caused higher cost in the linerboard.

SLIDE 3: Preliminary test indicate that rootlets of Douglas-fir will find and emerge through prepared holes in the container.

SLIDE 4. While there is some constriction, we have evidence that the styrofoam wall will be broken out by the expanding root. The linerboard on the other hand, presents no thickness against which the expanding rootlet can bear. If the linerboard does not deteriorate the rim of the perforations in the container may girdle the roots.

In order to containerize the seedlings we have developed an assembly line.

SLIDE 5. A worker places seedlings in individual holders on the machine.

SLIDE 6. As the holders move forward a container is placed on each mechanically. The roots are neither folded nor balled.

SLIDE 7. A second worker transfers each seedling and container to the potter.

SLIDE 8. On this potter carousel soil is carried by conveyor to the top and is filtered down into the pots and settled around roots.

SLIDE 9. A third worker crates the containers as they come off the potter and starts them down a roller conveyer toward a subirrigation trough.

SLIDE 10. The crates are then transported to nursery beds where they remain until shipment to the planting sites.

SLIDE 11. We are currently using plastic dishpans and milk crates until we settle on the final size of the crate. With a weight of one and one-half to two pounds per container we would like to keep the crate load to about 50 pounds.

The soil being used in our containers is a mixture of 60% peat moss and 407 sand. A balanced fertilizer is also added.

Our concept in container planting is to build a tapered hole which will match the container. As the tapered container slides into the hole the sides come into contact and there is no need for backfilling. In building the hole, we want to scalp back any vegetation and litter that is nearby.

SLIDE 12. Here you see an auger man preparing the hole while behind him is a planter carrying a small supply in one hand and slipping a containerized tree into a prepared hole with the other.

SLIDE 13. This is the conventional tapered screw-auger bit with scalping fins. In rocky soil it can hang up and be hard for the augerman to handle, however, in most soils it makes a clean hole.

SLIDE 14. This is a compacting-auger bit. It forces the soil laterally leaving the proper sized hole. It works best in a loosely compacted soil. Neither bit works well in mid-summer when the soil is dry and hard.

Getting the containers from the nursery to the planting holes is a major logistical problem. We are currently double or triple decking pallets of. crates on flatbeds or in vans.

SLIDE 15. For moving off the road we have tried the Mark VI Toter. It was too small and slow. The crates you see here are too heavy.

SLIDE 16. A more likely off-road supply vehicle is the Walverine or a similar vehicle built for industrial use.

SLIDE 17. There are many all-terrain vehicles but most are built too lightly. If a good supply system can be achieved, an augerman-planter team will plant about 150 trees per man-hour.

SLIDE 18. Some of the planting areas can be worked by machine. Here is the worm's eye-view of a planter head designed to make the hole and place the container. It did a highly satisfactory job in its first field tests.

SLIDE 19. This shows a concept which combines the hand drilled holes with a supply vehicle. The augers are hydraulically powered. The power unit can be carried on the same vehicle supplying the containers to the planters.

The real limitation to machine planting may be finding a carrier able to move it over rough ground. In any event there will be a need for the hand planting crew.

The proof of any container system lies in its doing a satisfactory job at a tolerable cost. Our containerized seedlings planted from Snoqualmie Falls, Washington to Springfield, Oregon in late May 1968 had only 4 percent better survival than normally planted Douglas-fir bareroot comparisons, but the first season growth. was twice as good. This chart shows first year survival and growth comparisons for 1969 plantings. We are particularly interested in extending the planting season so we have planted each month since April.

Our best estimate of the total cost of container planting is about $150 per thousand. This figure will be hard to lower, but I doubt if that is too high a cost if the only way to accomplish the planting task is through the use of containers.

We do not expect to replace bareroot planting, but we see container planting as another tool in the regeneration forester's hag that will help him do his thing.

CONTAINERIZED PLANTING

Goals – 1. Improve survival and early growth
2. Control spacing
3. Extend planting season
4. Reduce required manpower by
(a) increasing individual productivity
(b) substituting machines for men

Approaches – 1. Micro-containers
(a) Solid
(b) Soft

2. Macro-containers
(a) Potted bareroot stock
(b) Container-grown stock

Accomplishments – 1. Solid micro-containers in N.W.
(a) Two years of outplanting trials
(b) Development of outplanting equipment
(c) Plans for large-scale handling
2. Soft micro-containers in South
(a) One year of trials
(Unequal test of solid container)
(b) Continuing trials
3. Macro-container
(a) Container, potting machine, planting auger
(b) Tests of containers, media, size started
(c) Outplanting trial of survival and growth
(d) Large-scale handling trial
(e) Design of planting machine started