

## SEEDLING STORAGE AND PLANTING SURVIVAL

James H. Hill  
Hiwassee Land Company - Calhoun, Tennessee

### INTRODUCTION

Much has been written and discussed on the subject of the handling of nursery stock and its effect on survival. There will probably be nothing new or revolutionary in what I present but my purpose is to re-emphasize some of the practices that are used that are good and some that are bad.

The costs incurred in every phase of nursery production and distribution is of concern to nurserymen and administrators alike. However, when we look at the present day costs of land preparation and planting, the cost of seedlings is very small. Getting planting stock that will survive and grow fast is of prime importance.' Replanting an area because of poorly cared-for seedlings is just not acceptable to most landowners. Thus, to pay a few dollars more for good seedlings that are well cared for does not bother those that are investing up to \$100 per acre in land preparation and planting.

Those who are responsible for establishing successful plantations are constantly confronted with the task of correcting bad practices. Some bad practices come from carelessness, some from not thinking, some from ignorance, and some come simply from complacency.

Many times poor survival is a result of several bad practices occurring in sequence. All nurserymen have known for years the cumulative effects of exposing the seedling roots to drying, but have you thought about the exposure that occurs after the seedlings leave the nursery - in transporting the stock, after the package is opened and during the planting operation on either tree planting machine or planting bag<sup>3</sup> or tray. We have all observed good survival when we know that by all reason the planted seedlings should have died. Let us ask ourselves, "Why"? Usually it boils down to either good moisture conditions at time of planting or a favorable rainfall pattern after planting (which is not under our control).

### NURSERY HANDLING OF PLANTING STOCK

Exposure of seedling roots to drying has been discussed and documented many times<sup>2</sup> as to the effects on survival and I will not go further with this topic. Let us discuss instead the packaging of the seedlings and the effects of packaging on seedling survival. Several innovative methods of packaging have been tried and are in use in the South today. <sup>1/3</sup> The first question one should determine is whether a system of packaging does the job under all the conditions that occur in storage, in transporting to the planting site-and again, storage at the planting site. Are you satisfied with the survival and growth of the seedlings grown in your nursery? Do you know how the trees from your nursery survive as compared to another nursery?

Some of the characteristics that are looked for in a material for keeping the roots moist are 1) moisture holding capacity, 2) availability, 3) cost. The package itself has taken several forms in the past few years. From the waterproof paper roll using strapping, to the multiwall bag, to wooden crates and returnable boxes.<sup>4</sup> Again - is the package capable of protecting the seedlings for the time period and conditions that usually occur between the nursery and the planting of the seedlings. There is no excuse for the mishandling of the planting stock, but we all know that it occurs. Our concern as nurserymen is to furnish a "package" for the planting stock that will allow for at least part of the mishandling. Under a given set of circumstances our packaging method may be more than satisfactory, but the handling after leaving the nursery may lack a great deal.

#### SEEDLING STORAGE

Some nurseries are fortunately situated so that all seedlings are lifted and delivered to the planting site daily. However, most nurseries are growing trees for planting at some distance from the nursery. Deliveries of different lots of seedlings, distribution to individual landowners, and ultimately getting the trees planted, all takes time - sometimes several weeks. Thus, it is imperative that the seedlings be given the very best of care for extended periods.

Many nurseries are now installing refrigerated storage. This appears to be a large step forward. One small nursery in Florida has for several years used refrigerated box cars that were surplus. Since then several others have gone this route. They picked them up for very little and only had the costs of moving from the nearest siding to the nursery invested. Others have installed prefabricated coolers with capacities of from 3-to 8 million trees. These can be bought for as low as \$1.303sq. ft. (\$.763cu. ft.) plus the concrete floor and erection costs. This includes the refrigeration equipment. Slide - This one cost \$34,000 delivered, but not erected (1972 price). Still others have purchased enough used and/or new refrigerated semi-trailers to take care of several weeks storage of their stock. These measures are of extreme importance if the planting season is to be extended. It also helps the nursery that is beset by either rainy or freezing periods during lifting season to maintain a supply of seedlings for planting.

#### TRANSPORTING STOCK

Many of you see people arrive to pick up seedlings in everything from an automobile to a refrigerated van trailer. The arrival of a load of seedlings in a fresh condition is dependent upon several things. Among these are:

1. Distance - how long they are enroute.
2. Outside temperature - high or low.
3. How the packages are loaded on the truck:
  - a) cool air circulation around packages, to prevent heat buildup internally.
  - b) protection from hot, dry, outside conditions or low freezing conditions.
4. The condition of the stock when it was loaded:
  - a) still actively growing, or dormant.
  - b) roots moist, or on the dry side.

## STORAGE AT PLANTING SITE (or intermediate points)

1. Refrigerated trailer, or building.
2. Cool building with air circulation (fans)
3. Shady area (all day)

Whatever type of storage is used, the seedling packages need to be stored on pallets, racks, or laid single package deep.

4. The storage area should be near a water supply if the seedlings are going to be stored for over four or five days. If packaged in a sealed multi-wall bag, particular attention must be given to one of the first three storage methods. Heat buildup in the sealed bags is very fast on a warm spring day.

## CARE WHILE PLANTING

After all steps have been taken to get the seedlings to the field in good shape, here is the final place that all can be undone.

Once a seedling package is opened and the roots exposed, either on a mechanical planter or by a hand planter, the person putting in seedlings in the ground must be aware that the roots must be kept moist. Only too often we find planting bags or trays with no wet moss, or other wet material in contact with the roots. Because of the type of labor generally used, this is a constant and continuing source of mortality. Many of you have seen a planting crew shut down for lunch without taking time to cover or wet down the seedlings they have on hand.

## SUMMARY

There is nothing more discouraging to a landowner that has spent time and money planting trees than to get consistently low survival of his planted pine. The cost of the seedlings is small when compared to the cost of getting the trees planted and site preparation.

There are five major areas that may contribute to lower survival, these are

- 1) Improper care and packaging at the nursery.
- 2) Storage at the nursery.
- 3) Transporting seedlings.
- 4) Storage at intermediate points.
- 5) During the planting operation.

Of these, we as nurserymen can only control about three. Insofar as possible, we should make suggestions to the planters of the nursery stock that leaves our nurseries as to the ideal way of handling seedlings until they are planted, especially to the smaller landowners. Most industrial tree planters know what should be done, whether it is done or not.

Most industries that have large planting programs have done research as to the optimum time of the year for planting in the areas in which they operate. However, due to the size of the job they must try to extend the planting season on both ends and still get good initial growth and survival. This is being done by utilizing cold storage facilities.

#### LITERATURE CITED

Rye, Dale 1974. Cutting Cost in Nursery Operations, pg. 200, 1974. Southeastern Nurserymen's Conference.

Wakely 1954. Planting the Southern Pine.

Wynens, James C. 1974. Cutting Costs in Nursery Operations Southeastern Nurserymen's Conference.

Eagle, Dennis 1974. Moisture Retention Media in Packing, pg. 112, and Fisher, Dave 1974. Packing Material for Seedlings, pg. 135. Southeastern Nurserymen's Conference.