

## A DISCUSSION OF TUBED SEEDLINGS 1/

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Abstract.--The containerized tubed seedling provides the reforestation forester with another tool to accomplish his task of securing stocking on difficult sites. The process of rolling and planting the trees is described.

Many problems have confronted the people that are involved in reforestation over the past years, and I am sure that this will continue to occur into the future. One of the most frustrating of these problems has been to obtain satisfactory regeneration on soils that are of low productive quality. These are relatively new soils that have not developed an ideal productive growing medium. Our concern in the past has been areas that were involved in fire; but as the demand for wood fiber increases, and the virgin sites decrease, more of these poorer sites will be of concern to us.

Many tools have been, are being, and will be developed to help solve our problems. One such tool that was developed about 20 years ago by John Chauncey Price, Ranger on the Gifford Pinchot National Forest, and Forrest W. Deffenbacher, Nurseryman, Wind River Nursery, has had various degrees of success on severe sites, and is probably one of the first attempts in the use of containerized stock in Region 6. No doubt the development of this machine evolved around the do-it-yourself cigarette rolling machine that was popular during the depression years of the '30's as it is a giant replica of such a machine.

The idea of the machine is to place the roots of a bare rooted seedling in a suitable growing medium. Usually a two year old tree has been used, as the root system of older trees are too large to use in this manner. The rolling of the trees has usually been done at the nursery or ranger station, but it could be done in tents at or near the planting site. Transportation of the stock is a disadvantage of this process.

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The rolling of the tubed seedling can be described as follows: The handle is positioned toward the operator and about half of the required root media is placed in the pocket in front of the roller. The tree roots are then placed on the media with the top extending to the left or right of the outside of the machine. The root collar should be one half to one inch inside of the edge of the machine as part of the media around the top will probably be lost in the rolling process. The remaining cavity is then filled with the packing media, and the handle is advanced upward to start the roll. It is some times necessary and desirable to advance the handle half way or more to firm the root material around the roots and to get a nice round roll started. The roller is then returned to just above the base of the rolling table. A 10" X 10" paper towel is then placed just in front of the started roll and the handle advanced until about 2" of the towel remains to be rolled. A thin layer of linoleum paste is placed on the edge of the toweling, and the handle advanced to complete the roll. Any surplus roots extending beyond the lower edge of the towel should be trimmed off. An experienced employee can roll 700 to 800 seedlings in an 8 hour day. The trees are then stored in an upright position in boxes until needed. It is recommended that the storage period not exceed two weeks as the toweling will start to deteriorate.

Usually an additional person is required to mix the potting material and take care of the rolled trees. One person can care for 6 to 8 rollers. The trees have been used and are being used on very severe sites that has usually failed one or more times by the conventional method of planting. The sites are usually very rocky or on a hot south or west exposure. Varying degrees of success has been experienced by the use of this stock. However, it has usually been better than for other methods tried.

I feel that several things could be done

to make this tool more useful to our needs. As far as I know no work has been done on the proper material to use around the roots. In the past, various materials have been used by different people who were responsible for the rolling of the trees. This has usually consisted of about 50% top soil 25% to 50% peat moss and 25% to 0% vermiculite. Various types and quantities of different fertilizers has been incorporated in the mixes at different times, but to my knowledge no follow up has been made as to their success or failure. A plant physiologist could probably figure out a medium that would be more satisfactory to our needs.

The ideal root medium would need the following characteristics:

1. Have the capability of as much retaining as much water as possible.
2. Not have any harmful effects on the seedlings or the roots.
3. Promote fast and vigorous root growth.
4. Provide nutrients for the seedling until it has established itself in the field.
5. The material should be as light as possible and should be easily formed, hold it's form and not run out of the tubes.

The possibility exists of a better wrapping material than the paper towel. This material would need the following qualifications:

1. Material would need to retain its rigidity during storage.
2. The roots should be able to penetrate or it should break down soon after planting.
3. Ideally the material could furnish a nutrient source for one or more years.

I feel that one of the other problems that has caused considerable loss in the past is that of the tree being planted from the cold storage to the field. No doubt two or three weeks are lost while the plant changes its mechanism to fit the new environment. A study to determine if the tree could be run thru a controlled environment so that the roots had started to grow might help us in our problem. This hopefully would provide a shorter period of time between the planting of the tree and the time

that the new roots would start to establish themselves in the new environment. Conditions in the Northwest are often such that once the site is free of snow; severe drying occurs until fall rains. The amount of time that is lost between planting the tree and when the roots are able to provide sufficient moisture to provide for the transpiration loss from the top is most critical at this time.

The tubed seedling requires as much or more care than other planting stock. It should not be stored where drying could occur in the top. Limited amounts of moisture can be added to the tubes as a fine mist, but too much will cause them to deteriorate. Since most trees of this type has been planted on rocky sites, care must be exercised in selecting the planting spots.

The planting tool found most satisfactory is made as follows: A 1" black pipe about 10" long is cut and a small shaped end must be shaped and welded on the bottom. The pipe is filled with lead to about 2" of the top. A one inch iron handle is then inserted into this section and welded to it. A small step just above the weld will aid in working the tool into the ground.

The planting hole should be slightly larger but as near the diameter of the rolled seedling as possible. and should be slightly deeper than the length of the tube. If the toweling sticks above the ground, it will act as a wick and pull the moisture from the area around the tree roots to the soil surface where it is lost by evaporation. A handful of dirt, duff or other debris scattered over the top of the tube can help seal off the planted tube from loss of moisture to the atmosphere.

I believe that the tubed seedling can be a very useful tool in the reforestation forester's "bag of tricks". No doubt the process can be improved as new materials, knowledge, and expertise become available. The Wind River Nursery was able to roll trees last spring for fifty dollars a thousand. There is the possibility that a mechanical engineer could do some mechanization of the process and thereby reduce the costs. A thorough study of the problem could probably produce a finished product that would solve many problems on very severe sites. There can be no doubt in anyones mind that not only do we need a growing forest to protect the soil, water, and other values but future demands for wood fiber will require that we utilize all available acres for its production.