Field Packaging Pine Seedlings

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Abstract:

Great Southern Paper Company has utilized field packaging of pine seedlings since production began in its Woodlands Nursery in 1976. Production rates as high as 600 to 700 m seedlings per day are maintained with a relatively small crew utilizing a mechanical harvester.

Due to a number of reasons Great Southern Paper decided to construct a nursery in order to produce seedlings for use in its regeneration program. A number of decisions had to be made at the time with one of them being the type of packaging system to be used. Much thought was given to the types of systems in use at the time and visits were made to those nurseries utilizing the systems with which we were unfamiliar. Those systems in use at the time were the "Forest Service" type open ended bales, the open top wooden boxes, the "chicken" veneer box, and the kraft poly-lined bags. Subsequently, we decided to utilize the "k-p" bags in a packaging system located on a seedling harvester in the field.

The decision to do this was based in part on our desire to minimize the time of exposure of the seedlings, their tops, and especially their roots to unfavorable environmental conditions during the lifting and packaging operations,. This system also seemed to be cost effective in that it minimize

the number of people required to lift and packa[g]e a given number of seedlings. However, the use of this system was dependent upon the production of a consistently high quality seedling since no grading and very little culling can be done in an operation of this type.

Today, there are still several organizations which are utilizing field packa[g]ing systems although they may differ in the type of lifters and/or containers used. Field packaging has even been used in conjunction with hand lifting and has worked very well there too.

Field packaging can be adapted for use on any of the lifters currently in operation. Currently there are organizations using single and/or double row Mathis type lifters, or eight row Love type lifters who are packaging seedlings on those machines using either the k-p bags or the "Forest service" bales. In all cases manpower requirements are minimal as compared to those nurseries which utilize packing sheds for their seedling packaging.

In our operation, we utilize the k-p seedling bags on a two row Mathis seedling harvester. Immediately prior to lifting our seedling beds are undercut using a custom built undercutting blade and/or a Fobro lifter in such a way that the soil is very loose. This allows the seedlings to be gently removed by the lifter. Even with the soil being very loose and friable, the ground speed of the lifter has to be monitored in order to minimize damage to the seedling roots caused by excess ground speed. We use speed increasers on the lifter's hydraulic pump so that tractors without the hydrostatic

transmissions can be used to pull the lifter at ground speeds of one to three miles per hour.

The seedlings are removed from the soil with the inward turning belts and are transferred upwards to a conveyor belt on the rear of the lifter. As the seedlings traverse this conveyor belt two men attempt to: (1) remove as many visible culls as possible; (2) better align the seedlings tops and roots; and (3) shake excess soil from the root systems.

As the seedlings reach the rear of this belt, they are gathered up and placed into seedling bags by two other persons (the third and fourth persons). The bags are filled to capacity with seedlings by these two persons while another (the fifth) places wet peat moss at various positions in the bags. This person also removes the filled bags of seedlings from the bag holders and replaces them with empty bags.

A large amount of peat moss is used in this operation and keeping the needed amount wet and available on a daily basis was a bottle neck. To avoid this bottleneck and streamline the operation, we modified a hydromulcher so that the peat moss and water could be mixed in it mechanically, transferred through a custom built valve into a large vat which is transported to the lifter with a forklift. This has minimized the time required for mixing the peat moss.

When the filled bags of seedlings are removed from the bag holders, they are moved to the two persons (the sixth and seventh) who sew the tops of the bags together using Fischbein portable bag closers. These two persons also mark each seedling bag with the current date, the species, and seed source of the seedlings in the bag. The bags of seedlings are then

transferred by conveyor to a trailer runnin[g] in tandem with the lifter or they are placed in temporary storage on the rear of the lifter. In either case, the seedlings are transferred from the lifter to refrigerated vans for storage until shipment to the field or to a customer's vehicle.

Our lifting operation is geared to company or customer needs in order to store seedlings at the nursery no lon[g]er than twenty four hours. Of course, occasionally, this storage time must be adjusted due to weather conditions, soil moisture conditions, or unexpected changes in orders.

Naturally, using this type system, we are unable to count the number of seedlings being placed in the bags. We make this determination by randomly counting a number of bags of seedlings lifted each day as well as by utilizing a bed inventory. We count the number of bags of seedlings coming from each bed or section as they are lifted and determine from an intensive bed inventory the number of seedlings per bag. If there are differences, adjustments are made accordingly. We are aware that the hag counts will vary by seedlin[g] sizes and attempt to work very closely with those receiving our seedlings to insure their receiving the proper number of seedlings.

This system of field packaging has worked very well for us. We can consistently lift and package six to seven hundred thousand seedlings in an eight hour day with a crew of ten people.

The determining factor in whether or not field packaging is successful in supplying good plantable stock is having high quality seedlings with which to begin. This is essential

since very little, if any, culling and/or grading can be accomplished on a mechanical lifter.

This system is effective in minimizing seedling exposure to harmful environmental conditions and is cost effective in that our labor requirements are minimized in the lifting and packaging of twenty to thirty million pine seedlings annually.