USE OF THE GRAYCO SEELING HARVESTER AT THE JOHN F. SISLEY NURSERY

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ABSTRACT

When the Sisley nursery was developed in 1979 our primary concern was to grow the best "quality" seedling possible and see to it that the seedling got to the field "intact". In the interest of efficiency and cost we made the decision to mechanize the lift ing operation as much as possible. After reviewing the use of seedling harvesters in different nurseries; under a variety of conditions, we selected the Grayco Model TH lifter. Among other reasons, we chose this machine because of its design to lift both the seedling and soil from the seedbed in such a way as to minimize root disturbance. Despite its limitations, this harvester has worked very well in our nursery.

Introduction

Prior to 1972 Georgia Kraft purchased seed and seedlings from whatever sources we could find, without alot of consideration for genetic value or morphological grades. By 1972 our seed orchard was in full production and all our seedlings were contract grown. As our planting program and the demand for quality seedlings increased, we realized that we needed to have more control over the growing, lifting and handling of our planting stock. The Sisley nursery was established in 1979 as a direct result of that realization.

Originally designed to grow 20 MM seedlings, we've doubled our capacity to 40 MM per year. The nursery is located on a site characterized by an Orangeburg series soil, ranging from sandy loam to sandy clay loam in spots. We presently have 102 acres under irrigation and grow our seedlings on a 2:2 rotation.

Even before a nursery site had been selected we decided that seedlings out of this nursery would be "graded" to insure a higher quality stock in the field. We made this decision for two reasons: first, it would enable us to have an accurate bundle count this is important to us because our planters are paid by the thousand and a firm count in the bundles would assure proper stocking. Secondly, we would have control, at one location, over what seedlings were being culled and what were being shipped for planting

The criteria for a grade 1 or grade 2 seedling is that it it meet certain dimensional requirments and be free of defects and damaged tissue.(We use Wakley's recommendations for size differentiation in our grading operation.) Although manual pulling provides the least risk in damaging seedlings when they're lifted, we felt that, due to the amount of time and labor required to grade, a compromise had to be made in the interest of time and cost. We therefore decided to mechanize our lifting operation as much as possible.

After looking at several types of lifters under varying conditions in other nurseries, we decided to purchase a Grayco Model TH seedling harvester.

Advantages

The Grayco Harvester is simply a potato lifter modified for nursery use on 4-ft. seedbeds. The machine consists of an under-cutter blade backed up by a series of digger chains which lift the seedlings out of the ground, transporting them to a series of shaker chains which separate the soil from the roots.

The machine's designed to lift an entire bed at a time. We like this not only because it saves passes on the field, thus reducing compaction, but also because it's relatively easy to position on the bed. We don't have to worry about lining it up on the drills or going in to pick up "stray" seedlings after the machine passes.

However, the feature that most appealed to us about the Grayco was the concept of its design. With the digger chains, it lifts both the seedlings and soil at the same time while leaving the root systems relatively intact. It made sense to us that this would result in less damage to the roots.

We find, that for our soil type, the Grayco is capable of lifting in wetter conditions than other lifters, thus widening our "lifting window" during the season. Needless to say, there are limitations to mechanical lifting in wet soil and we still have to rely on hand-pulling in some parts of the nursery.

Another, unexpected bonus we found with the Grayco, though perhaps not significant, is that the soil is left in a "semi-tilled" condition after lifting the bed by virtue of the shaker feature. This helps if the bed is to be re-used in seedling production the next year.

Disadvantages

Among the disadvantages we've found with the Grayco, one is that the seedlings come off the shaker chains in disarray and require a good bit of sorting. Additionally, seedlings with long lateral roots may become entangled in the rollers and can be damaged. This is especially true on beds with spotty densities where the laterals may radiate out farther.

Perhaps a critical drawback to this type lifter is that it may take up to a minute and a half for the seedlings to travel up the chains to where they're safe in tubs. Therefore, especially in dry, windy weather conditions, or on dry beds, the roots may desicate.

Another disadvantage is that the machine is very loud, 100+ dBs, so we require our people to wear hearing protection while it's in operation. However, we hope to at least minimize this problem with some modifications to the shaker cams by next season.

Operation

We had some problems finding the right tractor for pulling our Grayco. Either the minimum tractor speed was too fast or the tractor didn't have enough hydraulic pump capacity. We finally found that the IH 3488-Hydro worked very well. This is a 112-HP farm tractor with an "open-center" hydraulic system and a pump capacity of 14 gal per minute flow.

The tractor operator maintains a ground speed of .5 MPH while lifting the seedlings and controls all the hydraulic functions (position on bed, blade depth, etc.) from a valve set in the tractor cab.

We employ 80 people during the lifting season, 22 of which work on the lifting crew. Including the operator, we have 12 workers on the lifter - 8 people collecting and sorting the seedlings, and the other 4 handling the tubs.

We continuously off-load seedling tubs from the machine as it lifts the bed and these are taken up to a packing shed where the seedlings are processed.

Repairs Modifications

So far, after 5 seasons, our lifter's required very little maintenance. Perhaps the primary causes for operation shut-down are to replace worn cams, chain links or busted hydraulic hoses. The cams will last roughly 20 MM seedlings while the links may bend or break sooner, depending on the load that's put on them.

We've done very little to our machine compared to some nurseries. We built a platform overhead with a dead-roll conveyor with which to handle empty tubs; we had some new shaker rods built so that the shaker cams can be replaced without replacing the whole piece; and finally, we put shields around the hydraulic couplings to protect the sorters against busted lines.

Conclusion

We have only one Grayco at the Sisley nursery and it accounts for roughly 80% of the 700 M seedlings we lift each day. The rest of the seedlings are hand pulled. No doubt, the machine is capable of lifting more seedlings but the limiting factor for us is the grading operation. The 36 graders we have can count and grade a little over 600 M seedlings per day.

With the labor cost involved in grading and packaging the seedlings, we feel that mechanical lifting off-sets some of the expense of our operation. To sum it all up, we at the Sisley nursery feel that the Grayco has been a real asset to our operation and are very satisfied with its performance.