GRAYCO SEEDLING HARVESTER

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We all know what is desirable in a seedling harvester, but I am certain that we are not all together in our thinking on the type of machine that will do the best job for our respective operations.

My knowledge of the Grayco Harvester is limited, but with the help of Grayco personnel and Will Schowalter with the U. S. Forest Service, I have put together some information that should be of interest to all nurserymen.

Westvaco demonstrated the harvester and found it to be a well constructed machine but felt that it did not meet our objectives. We want a harvester to do the complete job of lifting and bagging with a minimum number of employees. Also, our seedling needs vary from 250 to 300M per day which is substantially less than the Grayco Harvester's production rate.

The U. S. Forest Service is well pleased with the performance of its Grayco Harvester at the Ashe Nursery. Others are being used in Canada and elsewhere.

Now, I will cover the advantages and limitation of the harvester, as I see them with Grayco and U. S. Forest Service slides.

PHYSICAL DESCRIPTION

Construction - Dimensions: Approximately 20 feet long by 6 feet wide

Drives: Primary, is from tractor through P.T.O. with heavy duty oil-bath gear box and roller chain. Over load protection is achieved with Morse frictional slip clutches. Sprockets are made of steel. Secondary, is by 12 H.P. air colled motor with clutch and govenor.

Conveyors: Four in all, with a total width of 56" made by Grayco of high carbon steel.

Bearings: Ball bearing, pellow block agricultural series.

Hardware: Conveyor drive sprockets are the split type.

Depth Control: By hydraulic. Standard 3 inch diameter by 8 inch stroke 1,000 P.S.I. cylinder.

Frame: Study steel construction.

Wheels: Adjustable for width

Weight: Slightly over 2 tons

Pitch: Conveyors are 28 inch 0. A. with 1.56 pitch

Power Requirements - Tractor with upwards of 50 H.P. with hydraulic system and three-way valve and 1,000 P.S.I. A live P.T.O. is essential. Also, tractor with hydro static drive is very desirable.

Rated Capacities in Seedling Production - This machine is capable of lifting 500M to 1,000M seedlings per day depending upon method used to process seedlings as they come off conveyor.

OPERATION OF MACHINE

The depth of undercutting is hydraulically controlled once the proper setting has been made on the adjustment rods located on the sides of the blade.

The seedlings pass over the blade onto a short conveyor, powered by P.T.O., to another conveyor system which transports them to the pallet mounted on rear platform. This conveyor has a built in high frequency agitator which removes the excess dirt from the roots. Its source of power is a 12 H.P. air cooled motor with clutch and govenor.

ADVANTAGES

1. Simplicity of design - parts are widely available and easily replaced.

2. No specially trained operators required

3. Entire seedling bed lifted in one operation

4. Does not damage root system

5. Cost Comparisons

Purchase: The cost of the machine ($5000 to $6000) falls within the price range of the single row belt type lifters and considerably lower than more highly complicated machines ranging in prices $10,000 to $25,000.

Maintenance: No cost data available, but should be lower than most models.

6. Production rates compared to other systems - Will Schowalter said that he could harvest 800M seedlings per day with the Grayco machine while he was having trouble lifting 400 to 500M per day with the Mann lifter. He believes that he could reach 1,000M per day providing he had continuous operation on one species.

Single row harvesters range from 200 to 600M per day.

We were not geared to high seedling production when we tried the machine. Our bottle neck was getting the seedlings away from the machine with the limited number of pallet containers that we had. However, we were able to lift at the average rate of 80M per hour when we could keep moving.

7. Operable under adverse conditions - The Ashe Nursery was able to operate under extremely wet ground conditions and on fairly heavy soils (mostly orangeburg and runston sandy loam).

One person reported that he was successful in operating with 3 to 6 inches of snow on ground, 1/2 inch frost, air temperature 36°F and winds 15 to 20 M.P.H.

LIMITATIONS OF GRAYCO SYSTEM

Tangled Roots - Westvaco's main objection was the matted and tangled seedlings as they came off the conveyor.

Sprocket and Chain Wear - Anytime you have metal moving in contact with metal, you are going to get a certain amount of wear. The sprockets, cams, and contact area of the chains wear quite readily.

MODIFICATIONS OF SYSTEMS TO MEET SPECIFIC NEEDS

I am not aware of any major modifications made or being considered to improve the performance of the machine. However, there are two minor modifications which have been tried.

1. Forest Service Modification - The Ashe Nursery used a board for the seedlings to slide to the ground.

2. Westvaco Modification - We thought that it would help to have all of the seedlings come off the conveyor with tops in one direction. We placed 2 X 4's above the conveyors to accomplish this purpose.

SUMMARY

In conclusion, I would like to re-emphasize that my knowledge is limited on the advantages and limitations of the Grayco Harvester. Each of you can evaluate the machine and determine if it will meet your specific needs.