

WHAT'S NEW IN NURSERY EQUIPMENT- WITH THE INDUSTRIAL NURSERIES

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When I accepted the assignment of answering the question, 'What's new in nursery equipment - in the industrial nurseries?', I thought that the hardest part of my job would be to screen out the many new developments and decide what few to talk about during the limited time available. I naturally assumed that each nurseryman would reply to my questionnaire with a dozen or so pet projects that he wanted to brag about, but this was not the case. On the basis of the response I received, we can arrive at one of two conclusions: either there has been very little going on in the way of equipment development or we have the most modest bunch of nurserymen in the country. Actually, I think both of these conclusions are at least partially valid.

In reality, there have not been many spectacular developments in the way of nursery equipment since the last time we met in 1961. As in any business, most changes and improvements in plant and equipment come about during an upswing in the business cycle; or, as in this case, in seedling production. This is true because increased production usually requires more equipment modification and more mechanization. Since 1961, the production of the industrial forest nurseries in the Southeast has generally remained at about the same level or, in some cases, slightly declined. The few years immediately preceding this period was characterized by a strong demand for seedlings (Soil Bank) and was, in fact, the period during which most of the industrial nurseries were built and most of the equipment developed and standardized. So we can readily see that the period of leveling-off in seedling demand was accompanied by a similar leveling-off in equipment development.

While there has been little in the way of spectacular development, there has been a constant effort made in all the nurseries to refine and modify existing equipment. These refinements and modifications individually are hardly significant but their total effect on the nursery operation is considerable. I think it is safe to say that no individual nursery operation is performed today exactly the same as it was 3 years ago; all have been affected to at least some degree by minor improvements in equipment. Most of these are considered by the nurseryman to be too insignificant to report so you will not hear much about them today; however, this is not to minimize the impact they have on the overall nursery operation. The real effect of these improvements might best be appreciated by considering their collective effect on a particular phase of the nursery program.

I think that the best way to approach the discussion of this subject is to consider the various broad phases of the nursery operation, to summarize the current general approach to each phase, and point out any significant developments in that particular area. Then I have a few slides with which to better describe some of the equipment discussed.

Most of our nursery operations can logically be broken down into three distinct phases: (1) seeding and mulching operations, (2) cultural operations, and (3) harvesting operations. We will consider the present status of equipment usage as it pertains to each of these broad categories.

Seeding and mulching operations

Seeding and mulching operations at all the industry nurseries are very similar, so the equipment for the most part is basically the same. I believe all the nurseries use the Planet Junior Seeder, but I'm equally certain that each of the nurserymen has made adjustments and improvements in the seeder to fit it to his individual operation. For example, some have modified the seeder to permit the seeding of smaller seed species, such as sand pine and Virginia pine. Also, there have been various changes made in the rollers and foot assemblies which control the dispersal of seed in each row, and bed-width packers have been found useful in some cases. Most nurseries are using the Whitfield Bed Shaper or a variation thereof but other machines have proved just as good under certain conditions for making seedbeds.

The twin problems of mulch and mulching are two of the most important considerations in nursery practice. Not only is it one of the most expensive operations but it probably has more bearing on the success or failure of the seedling crop than any other single phase of the operation. For these reasons, nurserymen are constantly seeking better and less expensive methods of accomplishing this very essential operation. As in the case of seeding, the basic equipment is essentially the same at all the nurseries but has been tailored to fit the individual nursery situations. All the nurseries rely on pine straw at least to some extent, and most of them use it exclusively; however, some nurseries use sawdust as the primary material and some use it only in special circumstances. Both sawdust and pine straw can be distributed with the same equipment, generally a P.T.O. - driven manure spreader. An interesting innovation in the seeding-mulching operation is being used by Kimberly-Clark and only requires minor modifications in bed making and mulching equipment. A layer of sawdust is applied prior to seeding, the seed are sown into the sawdust, and then covered with a light layer of straw. Walt Chapman reports that this has almost eliminated his damping-off problem and I hope he will further enlighten us on this practice during the meeting.

Probably the single most important development in the way of mulching equipment to come out in recent years is the use of mechanical choppers or shredders to reduce the length of pine straw. This permits more uniform distribution of the mulch on the beds and thereby eliminates almost all the labor previously required to straighten the straw. Many nurseries have adopted this practice and most have found it to be very beneficial; however, the shorter straw is less stable on the beds than long straw and is, therefore, undesirable under extreme conditions. There are many different types of choppers being used for this purpose and anyone interested should investigate all of them. Incidentally, these machines can also be used for shredding sphagnum moss.

One other item of equipment associated with the seeding operation which has proved useful is a small concrete mixer for treating seed. Many different home-made tumblers have been used for this purpose but if you have a sizeable amount of seed to treat, for the nursery and direct seeding, you will probably find a mixer to be well justified. Mixers in the 1/3-cubic-yard range can be purchased for a little over \$100.00 and are well worth the cost.

Cultural operations

The equipment now being used for cultural operations, such as spraying, watering, fertilizing, and weeding, has changed very little during the past few years. For the most part, nurserymen are using the same spraying rigs and irrigation systems they started with. Some nurseries are using the regular irrigation system for top dressing seedlings by using permanent mixing and injection apparatus or using patented applicators which can be attached to either permanent or portable lines. One such attachment is the Model P Prizer Applicator used by Buckeye. Fungicides and insecticides can also be applied through these as well as the permanent systems.

One of the greatest boons to cultural operations in recent years, at least from our standpoint, is the mobile weed puller. Whether tractor-driven like Rayonier's or self-propelled like ours, such tools are money savers in nurseries that have persistent weeds which must be pulled by hand. I'm not sure how many other nurseries are using such equipment but there are several variations available to use as guides if anyone is interested. Ours is not as pretty as some succeeding models, but you're welcome to look at it.

We have been working this summer on a "basal spray" rig with which I hope to be able to control water grass and other grasses which develop beneath the seedling canopy and are, therefore, not susceptible to the regular overhead spray rig. The rig includes nine drop nozzles per bed, with the spray tips located 2-1/2 to 3 inches above the ground. So far we have applied as much as 100 gallons per acre of mineral spirits with little damage to the pine seedlings but with less than complete kill

of the grass also. I'm hoping someone at this meeting can show me a more ideal selective spray material.

Harvesting operations

As in the other major phases of nursery operations, the equipment used in harvesting has not changed a great deal during the last few years. Here again, all the nurseries use different techniques, adjusted to their individual needs. Since the companies use most of their own seedling production themselves, we have an advantage over the state nurseries of working with one customer instead of many and, therefore, can more easily anticipate and schedule production. In at least two cases, the nurseries are accessible enough to the field planting operations to permit minimum and temporary packaging. This permits the use of "tobacco picker" type equipment in the nursery to pull the seedlings and pack them in wooden or paperboard boxes for direct delivery to the field. This eliminates the need for rehandling the seedlings in a packing shed and permits a savings on packaging material. This method is not feasible for nurseries requiring higher production rates or more permanent packaging such as the standard bale used by the majority of industry nurseries. This bale, of course, utilizes reinforced kraft paper (sold, incidentally, by Union Bag-Camp) and is tied with steel strapping, either flat or round. All the nurseries with which I am familiar use sphagnum or peat moss in these bales; possibly some nurseries in North Carolina use clay or other material in lieu of moss. Most of the nurseries which bale seedlings in this manner or something similar have been using the same general methods in the entire harvesting operation for the past several years and are using the same basic equipment. However, one nursery (Bowaters) is having success with the use of pellets and a fork lift for handling the seedling bales after packing. I'm sure other of us would be interested in the economics of this operation.

The only major change in harvesting equipment during the past few years has been the use by some nurseries of a Mann-type seedling lifting blade. About half of the nurseries are now using similar machines and comments from the nurserymen who have used them are generally favorable. Our own experience has been that this type blade, by its gentler lifter action, destroys less of the small fibrous roots and root hairs and thereby contributes to the harvesting of a better grade of seedlings. We hoped that this machine would reduce labor costs, since the seedlings are easier to pull, but this has not been the case so far; however, it is slightly less tiring to the pullers. This is one of the most expensive operations in the nursery and one which can stand a lot of improvement.

None of the industry nurseries have found a need for electronic data processing equipment as the state nurseries are using because we work on day-to-day schedules, are mostly concerned with only one customer, and do not maintain inventories. In connection with harvesting

activities, most nurseries have found that two-way radio communication between the nursery and the field organization is a great asset in scheduling seedling production and delivery.

Summary

There have not been many spectacular developments in industrial nursery equipment during the last few years. This period has been characterized by a leveling-off in seedling production, following a period of high production during which most nursery equipment was developed and standardized. However, refinement and modifications have been continuously made to improve equipment and the aggregate effect of these improvements has been a substantial improvement in nursery practices and operating costs.

The equipment which has been developed has been mostly aimed at lowering labor costs and this will likely be the direction in which efforts will be aimed for some time to come. Since the greatest amount of labor is used in the harvesting process, this is the specific area which should receive the most attention in the immediate future. It is to be hoped that machinery can be developed which will lower the number of people required for these operations and result in lower seedling costs without jeopardizing seedling quality.