

PLANT-A-PLUGS SYSTEMS

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Abstract

A new nursery system for practical automation of growing and planting containerized seedlings. Plant-A-Plug System produces and markets to you a complete system; green house, multi-cavity styrofoam container, soil loading and seedling equipment, planting tools, and a commercial contract grower of containerized plants.

I would like to take this time to thank you for the opportunity to explain to you what we are doing at Plant-A-Plug Systems.

We are a Crossett based operation with our corporate headquarters in Dallas, Texas

Plant-A-Plug Systems gets its name from a total system of growing and planting plug seedlings from a multi-cavity styrofoam container. There are several reasons why we choose this container over many other styles of containers.

1. The necessary set-up and the practical automation of planting and growing in the nursery.
2. The type of growth of the seedling and root structure and its response to growth and survival in field planting.

This system has been under intensive scrutiny by several West Coast forest industries and has shown itself as the best all-around system.

In our container there are 192 cavities per block and each cavity has a 2 1/2 cubic inch capacity. The cavity top diameter is 1 inch and tapers down to a 1/4 inch opening at the bottom. Each cavity is embossed with 4 ridges on the inside of the cavity to prevent root swirl. On the bottom of each block are 2 runners which prevent the bottom openings from ever touching the bench and in turn prevents the spread of disease since each cavity is completely isolated and allows air circulation under the block. This air circulation is necessary for root prunings as the main roots grow out of the bottom of the container. The air prune, which causes a flush of the feeder root grows up and down along the main roots.

When the trees drop their seed coat, we will start fertilizing every time we water. We use a water soluble fertilizer mixed in holding tanks. We water as the trees need it. We can determine this by a comparison of wet weight versus dry weight. In order to maintain optimum growth, we monitor the soil pH, the toxic salts build-up and soil analysis. We also leech the soil in order to prevent a toxic salt build-up.

The seedling has a good balance of root systems compared to the stem. The plug is held together by its own root system which forms a mat by the roots growing around and through the soil media making itself a containerless containerized seedling.

The quick dibble was developed by a research forester for Georgia-Pacific Corporation on the West Coast and is sold exclusively by Tri-State Mill Supply Company. The planter works on the pendulum method. It is hinged at the top and as you step on the foot pedal the dibble swings over throwing the tube out of line and makes a hole in the same configuration as the plugs. As you pull up on the handle, the dibble swings out of the way putting the tube back in place. You then extract the plug and drop it down the tube and the plug fills up the hole leaving no air pockets and no J rooting. The root system is undisturbed and suffers no root shock. You pick up the tool, heel in the seedling and move on.

The blocks set in an interframe that sits on an offset cam which lifts up the frame and drops it. The sterile soil media is then scooped into the loader and spread around. The loader shakes the soil into each cavity for an even fill. The soil media is a 50-50 mixture of peat moss, vermiculite, trace elements, lime, ferrous sulfate, and starter fertilizer.

From the soil loader, the blocks are then passed onto the soil compactor. This is a press that has 192 fingers in the same configuration as the block. You slip the block into place and pull the lever down which compacts the soil snugly into the container. This is a very important step because by packing the soil it aids in forming a good solid plug. I can not stress this enough. This compaction is a very important step.

From the compactor your next step is to seed the block. The seeder utilizes a simple method of a sliding false bottom. There is a seed reservoir at the top. You pick up the seeder and shake this over the upper bottom and fill each hole with the seed. You then fit the seeder over the block and slide the upper bottom over the holes drilled in the lower bottom which are drilled in the same configuration as the cavities in the block. The seed then falls into the depression in the soil. You plant 192 cavities at one time.

We put more than one seed in each cavity in order to get a full stand in each block. The upper bottom comes with extra plates for different size seed.

In growing the trees, we force grow them by keeping optimum conditions. We start with a high nitrogen fertilizer for approximately 2 months then change to a high phosphorus fertilizer for 2 months, and finish by adding a high phosphorus and potash fertilizer.

About 1 month before we are ready to send out the trees, we start to stress the seedling which has been growing under optimum conditions. The root system has not had to really hunt for its food and water so by cutting back on the fertilizer and water, root growth is stimulated

to develop a total root system to supply ready access to moisture and nutrients. This gives strength to the total plant.

The trees are shipped from the nursery in the containers, cut into 1/4 sections for better handling, and arrive at the field completely undisturbed.

In the back pack system, one man can carry approximately 400 trees in the back pack and on the belt. The pack frame provides a comfortable package with weight on his shoulders. The pack and trees weigh approximately 28 pounds and become lighter as the trees are planted.

Weight is a very important factor in out-planting. The larger the container, the bigger and better the tree. But we have to come to some realistic size of container for both out-planting and growing in the nursery. As you go to a larger plug, the space it takes up in the nursery will cost more. This increase must be passed on to the cost per seedling from the nursery.

The out-plant is as big a break-through for the planters as the nursery system is to the nurseryman.

With this system, one man can plant 2-3 times as many trees per day compared to bare root. The cost per acre compares favorably to bare root planting costs. Besides being able to increase your survival to 90%, you extend your planting season to 10 months of the year and have very little root shock and quicker growth of the seedling.

Our green house is a simple design made of ridge steel bows covered with 1 inch mesh wire, covered with 2 layers of polyfilm for winter growing and shock cloth for summer growing. We have an automatic watering system and climate control with heating and ventilation systems. We are equipped with light to extend the photoperiod.

The thrust of our program is that we produce and market to you a complete system; green house, multi-cavity styrofoam containers, soil loading and seedling equipment, planting tools, and are a commercial contract grower of containerized plants.

Here I have depicted pine seedlings, but we are not limited to pine seedlings. We have grown a variety of other plants in the multi-cavity styrofoam container.

The soil loader, compactor and seeder are an inexpensive method for practical automation of your nursery.

The quick dibble system closes the loop by providing greater speed and ease in out-planting and effectively handling the seedling for out-planting. This reduces your planting cost.