

## EFFICIENCY TECHNIQUES IN PROPAGATION: METHODS AND PROCEDURES

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Efficiency is a measure of production compared to cost of time, money, and energy input. How often have you said to yourself or told others that you could have done more except you ran out of time or money or energy? We do not have unlimited resources so our task is to maximize productivity within our resource means.

### EFFICIENCIES IN PERSONNEL AND LABOR

Consider how many decisions are required to make a propagation department run smoothly and effectively. Decisions are made by people that are armed with facts, figures, experience, and sometimes instinct. Labor expenditures represent the best area to capitalize on efficiencies. As much as any other part of a nursery, the propagation department should be staffed with good decision makers.

**Management:** Management should provide leadership, set goals, and provide resources. Production targets are set prior to the propagation season, but they are reviewed constantly. Production targets are determined by input from sales data and sales staff's opinions and produce merchandise for which there is a market. A well thought-out production plan can move your nursery towards prosperity, providing you with generous supplies of salable plants. Depending on the type of nursery one has, the production plan you conceive today will correlate directly with your success 12 months, 24 months, or 36 months from now.

A good manager will provide adequate amounts of supplies, observations, ideas, facilities, equipment, and personnel for his propagation department. Managers should understand the overall picture and grasp situations as they are and are likely to be. Experience is irreplaceable and becomes more valuable each year. A good manager rewards achievement and shares prosperity. He has compassion but not to a fault.

**Supervision:** An efficient supervisor is honest, communicative, personable, predictable, concerned, intelligent, motivated, resourceful, and dedicated. Deficiencies in these characteristics distract from his or her ability to work with management and labor. Initially supervisors are problem solvers and they grow into problem preventers. Supervisors have primary responsibilities to management. However, they are also responsible for labor's morale and fair treatment.

**Foremen:** Foremen should be honest, communicative, enthusiastic, concerned, motivatable, or motivated, resourceful, and dedicated. She or he is likely to be concerned about efficiencies of day-to-day operations. Foremen oversee activities of five to 10 people.

**Labor:** An ideal laborer is dependable, pleasant, free of persistent personal problems, resourceful, honest, motivatable and perfectly adapted to piecework. Management does not suffer from excessive loan requests, sour attitudes, absenteeism, deception, and low productivity with this type of employee. An efficient laborer makes piecework consistently and, in fact, cannot maintain his standard of living on the guaranteed wage. This type of employee responds to non-piecework jobs with speed and enthusiasm, in haste to return to a piecework job. Good laborers such as mechanics, truck drivers, and watermen who do not get the opportunity of piecework must be paid enough to retain their services.

Small nursery owners may find themselves playing management roles or labor roles, whichever is the case. Time, money, and energy expenditures versus production must be carefully evaluated under these circumstances. Efficient utilization of labor represents fertile ground for increasing profit.

## EFFICIENCIES OF FACILITIES

Efficiency, propagation techniques, and procedures cannot be discussed without reference to physical facilities operated. There are three cornerstones that will allow a nursery to survive and progress; people, plants, and facilities. One cannot hope to be efficient with an inefficient greenhouse, rooting areas, or growing beds.

Propagation facilities need to be economical to build and maintain. The cost of construction will vary, mostly due to climatic conditions encountered in summer and especially in winter. Along the Gulf Coast a gutter-connected greenhouse designed to root azaleas, hollies, and other broad-leaved ornamentals can be built for \$1.30/ft.<sup>2</sup>. A greenhouse normally is unnecessary to the production of photinia, juniper, and Chinese-holly liners. In this case a full-sun mist area, properly shaped and prepared, is the economical facility to build. Mist areas under saran shade houses along the Gulf Coast are adequate to root many euonymus and azaleas.

Cutting sheds, greenhouses, mist areas, and storage buildings should be designed to make work easier, rather than more difficult. One should plan adequately to match equipment utilized and facility design. Permanence is a key consideration in the construction of propagation facilities.

## EFFICIENCIES IN EQUIPMENT

How does one decide on the equipment necessary to use in a propagation department? Sometimes the question is clear. "Yes, this piece of equipment is necessary because: 1) It will lower my production cost; 2) It will increase my production; 3) It saves time; 4) It will reduce the energy required to get the job done; 5) I cannot get the job done without it."

Areas where equipment can be used are soil preparation, seed cleaning, flat filling, soil testing, business managing, trimming, communicating, material handling, transporting, heating, cooling, pest control, shipping, and others.

There is no question certain pieces of equipment are absolutely necessary. Telephones are critical to communication with customers, friends, and suppliers. A small grower who is responsible for most phases of his production should consider a portable telephone combination with the ever-dreaded recorder. Larger companies, such as Flowerwood, rely on FM radio systems to maintain communication lines. If a machine pays for itself, you need it.

Large computers for large nurseries are essential for accounts receivables, payroll, invoicing, shipping, sales, inventory, book-keeping, and production planning. Electric golf carts are reasonably priced and useful to move around in propagation areas. Gasoline or electric clippers are fast and easily used to trim large groups of liners. One can afford to spend \$2200 to purchase an Orion 940 selective ion analyzer with NO<sub>3</sub> electrode and a Beckmann solubridge to perform leach tests for nitrate, salts and pH if it pays off in improved production.

## EFFICIENCIES IN CHEMICALS

Significant advances have been made in the use of chemicals in nursery production. As a result good nurseries have become very plentiful. Growers used to battle leafspots, root rots, blights, and other plagues with little more than their possessed art of growing plants. Modern chemistry now provides effective fungicides such as Subdue, Aliette, triforine, and Benlate to do battle on these fungus pests. Modern chemistry has made possible the use of Ronstar, OH-II, Rout, Surflan, and other herbicides to help solve the weed problem. Modern chemistry annually provides better and safer insecticides.

Science has allowed nurserymen to win the war of resistance in fighting spider mites and will provide answers to the troublesome western thrips currently posing a new problem to nurserymen in the South. Nurserymen need to be attuned to new weapons, each year discontinuing ineffective, outdated chemicals and incorporating new and better pesticides.

Another important scientific advance for horticulture is the

improved formulation of fertilizers. Container growers do not think in terms of tons per acre. They measure pounds per yard, grams per container, and parts per million when they fertilize. When thinking of nursery fertilizers, many have determined that good fertilizer does not cost; it pays! Therefore, nurserymen are willing to purchase premixes, slow-release and liquid N-P-K fertilizers that are expensive per ton but very cost-effective and dependable. Modern nurserymen are meticulous in their fertilizer application.

Rooting compounds are also great chemical tools available to nurserymen. IBA, NAA, their mixture, and now another group of their phenol derivatives have transformed propagation procedures in many nurseries. The use of these chemicals is very rewarding, and one should make advances and changes yearly as he experiments and learns.

### EFFICIENCY IN PIECEWORK

Our challenge of high production and quality control can largely be accomplished with the piecework system. This system stimulates production and rewards accomplishment.

To establish a piecework system three criteria should be established:

1. Procedures—Step 1, step 2, step 3, and on to completion
2. Specification—Quality control
3. Expectation—Number per hour

Without piecework or accountability a laborer will give 50 percent performance. Just accountability will give you 75 percent. Rewarding production gives you 100 percent effort. An employer can set a cost rate that is acceptable and fair to the employee and himself.

#### Examples of piecework rates:

Job description	Cost per unit
Throwing dry fertilizer on beds . . . . .	\$0.002/linear ft.
Putting new 2¼-in. liner pots into trays . . . . .	0.095/tray of 64
Putting soil into trayed liner pots w/shovel . . . . .	0.086/tray
Moving liner trays from houses to areas . . . . .	0.12/tray
Dividing and replanting lirope . . . . .	0.02 each
Trimming liners with electric clippers . . . . .	0.02/tray
Boxing liners . . . . .	3.50/1000
Cutting, stripping, & sticking	
<i>I. crenata</i> hollies . . . . .	0.0076 each
Cutting, stripping, dipping & sticking	
<i>I. cornuta</i> hollies . . . . .	0.0097 each
Cutting, stripping, dipping, scaring, and	
sticking camellias . . . . .	0.0115 each

To establish a piecework rate, you can use your best employee's

performance and determine the value of that performance to you. Or you can perform the job yourself for a certain time, count your performance, determine the fair and expected performance rate and establish a cost.

### EFFICIENCY SPECIFICS

Flowerwood Nursery propagates 75% of liners produced by cuttings. The remainder are produced by seed and division. Propagation by cuttings, if possible, is the most reliable method. However, at times we do not have the knowledge and ability to use cuttings. Therefore, we rely on other methods such as seed germination.

Seed germination of *Chionathus virginicus* is a 2-year process. Fringe tree seed are generally scarce also. In an attempt to propagate it asexually, we were successful in rooting only 2 percent of the cuttings made. The liners that were produced were grown on and the cuttings made from that group rooted with 80% efficiency. Propagation efficiency is a goal to obtain, and things may happen slowly at first. But efficiency is obtainable with patience. We are looking for more and more success with each generation of asexually-propagated fringe trees.

### EFFICIENCY OF TISSUE CULTURE

Micropropagation of tissue-cultured plants has brought the development of several laboratories with heavy investments whose purpose is to compete with conventional methods of propagation. Just how these businesses are to fit in with conventional nursery business or how well they can complement or compete has not yet been determined.

The laboratories require heavy capitalization. Sanitary, controlled conditions and expensive equipment are necessary. Hundreds of thousands of cultures, which can involve several million plants, can be propagated in only a few hundred square feet. The facilities are still heavily labor-dependent. This is an area of inefficiency. To date not many woody ornamentals are tissue cultured but successful examples are: raphiolepis, nandinas, and rhododendrons. Most labs have relied more on soft herbaceous species because they are easy and quick to produce. Ferns, daylilies, orchids, and assorted foliage items are easily propagated by tissue culture; consequently, everyone is doing them.

There is a future in micropropagation in the ornamental line of plants. Production of desirable genotypes that are disease-free and in high demand, will allow successful labs to fill voids and be very compatible with the nursery business as we know it today. Tissue culture labs should be conscious of the law of supply and demand and not overproduce. *Nandina domestica* 'Harbour Dwarf' has been

oversupplied by numerous tissue culture laboratories. The result is lower, less profitable prices at all levels of production.

We all have opportunities to increase efficiency. If you are operating exactly the same as you did 12 months ago, you are failing and your competition is gaining. Be flexible, progressive and open-minded to progress. Avoid following nursery tradition because of tradition. Set a tradition of change, progressiveness, and leadership; the result will be an increase in production, efficiency, and growth.

## **EFFICIENCY TECHNIQUES IN BALL & BURLAP PRODUCTION**

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Growing plant material in the ground has been around from before the time of Christ, but even with this vast span of time only the last 25 years have given us any real technical advances.

The shovel has given ground to the hydraulic spade. The hand-tied ball has been replaced in part by the wire basket. The in-row tractor has totally replaced the mule and Georgia stock. The forklift and pallet are quickly replacing the strong back and weak mind. Irrigation and anti-desiccants are extending the harvesting time. Various containers and concepts are helping overcome the shelflife problem of unplanted ball and burlap (B&B) material, and advances in the use of herbicides have all but eliminated the eyehoe.

But given these few changes in contrast to the many technical advances that have taken place in the last 2,000 years, in-ground growing of plant material, with its antiquated methods, still remains the very best way to grow and transplant many kinds of plants and trees.

At Windmill Nurseries, Inc. about 50 percent of our gross sales comes from the production of B&B material and I would like to give you details of several practices that we utilize in increasing our efficiency.

Hydraulic spades used on track-mounted skid loaders are by far the most efficient application for Windmill. We process the ball directly onto the haul-out wagon, thus eliminating the haul-out process. This requires additional wagons, but they soon pay for themselves.

The use of a ball ring keeps the ball in the upright position