Nurserymen - Midwives To Tree Improvement

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The topic assigned to me is such an accurate statement of our task that I welcome this opportunity to speak to you on "Your Part in Bringing Forest Tree Improvement to Life".

I'll keep my remarks brief. If you can apply all of the practices in soil and fertility management, pest control and stock storage that we have heard about today, your seedlings will be in good shape when they leave the nursery. Occasionally I've seen your product. I've heard about other seedlings you have grown. Many complements on your fine efforts! Take pride in your weed-free beds, your careful use of pesticides. The biological control methods some of you use even made last month's issue of Organic Gardener. Walnut, cherry, and larch seedlings have became legendary; their fame has spread to neighboring states. Your successes have been too numerous to individually mention. I honestly believe the stock you are now shipping is by and large of high quality.

Human nature tends to praise faintly, but damns loudly. If you want to be diplomatic, we can say there still is room for improvement. Let's hope you make room for improvement. That is the topic for this afternoon. What I have to offer are small, delicate seeds of thought. it's still up to you to bring them to bear fruit.

In this age of sophistication, we are tempted to let the specialists handle the tough tasks; the soil expert, the entomologist and when it comes to tree improvement — the geneticist. Growing top quality stock is still an art, a special art, still best learned by studying nature and not books . Its more common sense than computer program. Research results still have to be applied to your soil and your seedlings. We can't program seedling growth without constant surveillance and correction. You as the nurserymen-in-residence are your own chief trouble shooter. (After all, it is your responsibility). If your state has a genetics program, you will most likely be involved because geneticists are not nurserymen. They are often not even experts in growing plants. Now I'm all for helping you in growing your plants and in pointing out possible troublespots before they occur. The best defense is a good offense. I would suggest these hints to help:

I. The value of the trained or the carefully observant eye - to look for exceptions and abnormalities. It is one of the most worthwhile traits we can teach our children or can impress on our nursery help. This is something you just don't naturally inherit! You have to work at it day after day -- it's self-discipline, not memorization. Now daily observation is not anything like benign neglect.

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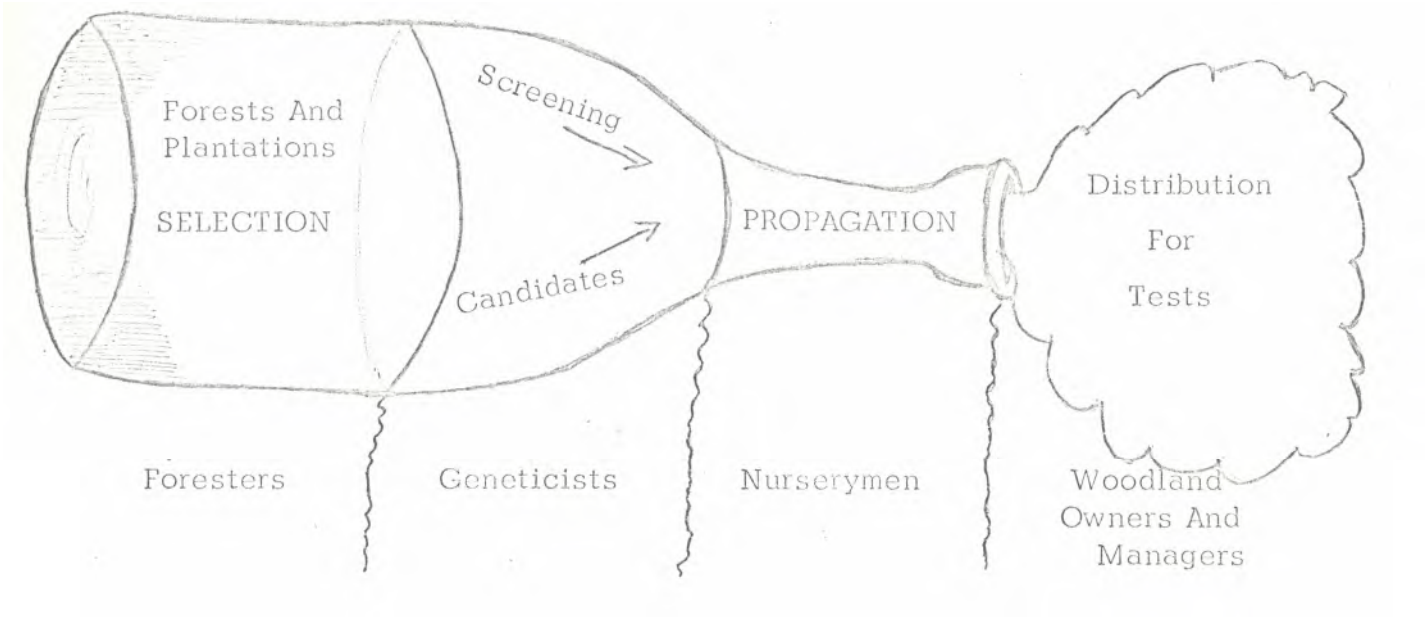
2. The value of the single "genetic" selection -- a one in 100,000 or one in a million choice. These are then propagated at $3.00-$5.00 per cutting. If only a few take, that's all we have as insurance against loss of that individual mother tree. I've been taken to see a $10,000 walnut, but all that remained was the stump. On the top of Middle-Mountain grows a "$500" black cherry. It took 8-10 man-days to locate, relocate, evaluate and collect scionwood in the late winter that produced 10 or a dozen propagules. A thread of life is yours to strengthen or to lose. Your job is to keep them alive. What is the cost of replacing material shot down in southern Ontario, cleared after two years through plant quarantine for induction to the United States? What is the value of another two years' wait? Last spring a 17 year-old hybrid poplar test planting was barely saved from the bulldozer blade. Material was sent out to five of our state nurseries. Some of you received them and I'd be interested in knowing how many of those 20 clones still exist because of your careful nursery skills. In spite of all the - words of caution, like the seed mentioned in the Bible, some were stuck in dry ground lacking irrigation, and some set among weeds. Because of my faith in your skill, I know some will bear fruit a hundred-fold. I see real drama in preserving these individuals - holding them in an arboretum. Just like a newborn baby, they have great potential if we can give them an honest chance at a fair test.

THE BOTTLE-NECK THEORY OF
FOREST TREE IMPROVEMENT



Foresters work over large areas with tremendous numbers of individual trees from which to choose. If the forester locates one or two candidate trees per year he becomes a contributing member of the tree improvement team. If the trees are not reported this year, maybe next year there will be soon enough. If all foresters reported five to ten plus trees per year the geneticists would be swamped with candidates, evaluations and propagation problems.

Geneticists feel they are doing well if they can locate, evaluate, approve and propagate 25 to 30 trees each year. Often these might represent several species. (So while we are grateful for help in locating outstanding trees we are not dependent on any one forester to find trees). If no trees are reported, geneticists have been known to go off and find their own plus trees. It is not particular efficient but the job gets done. If a tree or group of trees isn't propagated this year we can make a special effort to include them in next year's program. Foresters and geneticists only rarely encounter the live or die situation. The pressures just aren't that great.

Nurserymen should not feel badly that they are depicted as the bottle-neck in this diagram. You are in the mainstream - a most important position. You are in a position to speed up the activities as well as obstruct the program. Your skill can make the difference, because each germinating seed represents a once-in-a-lifetime situation. Each time we make a graft we face a now or never opportunity. Each time a graft droops or a cutting fails to strike roots or a special seedling dies - the entire program dies a little. Without good nursery techniques clonal seed orchards can't be established and seedlings will never make it into the field for a test. Testing brings us to a third point. Dr. J. W. Wright mentioned just last week in East Lansing that he expects nursery effects will last for up to 7 to 10 years . (Think of that, good nursery practices continue to effect the stock up to 10 growing seasons after transplanting when compared with poor practices). Naturally we expect the nursery influence will eventually be diminished by the overwhelming influence of field planting site. However Dr. Wright reports that the effects don't always go away. They often presist to age 15 - maybe even for the life of the plantation!

3. The Value of Record Keeping and Retrieval --

"Troubles" such as lost seedlot numbers, overlooked details of: fertilizer and weed control treatments, mislabeling the location and not mapping the area. How often have misplaced notes or "temporary labels" botched us up? Closely associated with this is

4. The Value of Repetition --

Just because it works once can we prove the result was not pure luck? Particularly critical maybe the specific time of application, the form or the amount of a nutrient; for example, nitrogen, the active rate of herbicide

per acre and the amount of soil-water stress - thus each clone or progeny from a single tree is tested in time and retested in space so we may assure ourselves that seedling or clonal performance was no accident. That's why we graft dozens of individuals of one clone! We have lots of confusing data on depressed growth from fertilizer applications. Why? My guess would be the lack of weed control and the resultant -- intensified competition. We have got to improve upon our "wild" crop of forest trees. We can and must improve our nursery stock, both physically and genetically.

You don't have to do it alone!

1. You may expect some help from the experts, too, in physiological grading systems for your seedlings.

a. We know photosynthetic rate drops quite dramatically with small levels of $SO_2 + O_3$ in the air.

b. We know that even before deficiency symptoms are noted in leaf color, oxygen production drops off sharply.

2. You should expect to be using simple phytotrons for complete control of various climatic factors, when growing special seedlings to avoid serious droughts, hail storms, or other "acts of God".

3. You should expect computerized record keeping, to bring to your attention real differences in seedling growth rates.

To emphasize the major points you should:

1 -- recognize the value of keen observation and develop all the eyes on your nursery. You should be able to almost feel the pulse of your plants.

2 -- Protect all the individual selections under your care. Save them in an arboretum-type out-planting.

3 -- Guard and protect your records. Keep them up to date, day by day.

4 -- Keep trying, testing and repeating a good procedure (even your best results). I'd like to say we learn by our mistakes. But as A. J. Riker said, "too often the one thing we learn from experience is we don't learn from experience." May you be able to reverse that trend!