

OUTLOOK FOR CONTAINER CULTURE IN THE NORTH

FRANK TURNER
Berryhill Nursery Co
Springfield, Ohio

At the outset, I ask your indulgence for a few side issues that are not concerned directly with propagation and culture. However, unless these issues are justified by common sense they would have little merit before a Society of our kind. Instead of posing the question, why grow plants in cans, I would like to submit the widely considered proposition that its practice is a method that promises a large degree of industrialization to the nursery industry. This aspect of industrialization, is drawing the interest of numerous mid-America, ornamental growers. It is viewed, after all factors of the equation are thrown in, as a tempting, less painful direction for expansion.

We had a number of questions in mind three growing seasons back, at our home nursery, in Central Ohio. There, we consider our operation to be on the glaciated edge of corn-belt soils, in a quite typical, reasonably severe plains climate. The plants we grow there are mostly listed for Rehder's Zone IV. We are situated on limestone soils. The culture of ericaceous material is precluded from three aspects, namely climate, soil, and water. This is an example of the broad picture anyone should take of his advantages or disadvantages in regard to doing something about growing. In a new venture it is a good thing to set up a proposal or statement of what you hope to do. Our proposal was to learn how to adapt a good and successful growing method for the moderate and warm temperature zones to a colder temperature zone. We still think today that is still the foundation statement for our effort and learning.

Almost immediately after our modest start had been made, we found that we would be required to learn not only the cultural adaptations of our stated purpose but also about several other sets of factors. Today, we are attempting to find out how to grow the crop, how to balance this container line with the accepted and required lines of plant materials, and how to educate our clients on the several aspects of superiority we think we have in our finished product. Taking these elements of experience in inverse order, the last one is clearly related to sales. I list it here because it is the eventual sale that regulates the size of the container to set out to produce the plant in. It also regulates the size that the plant shall be grown to, the amount of trimming necessary and the finish desired. Sale also calls for the application of every modern merchandising device. Some of the simpler ones are eye appeal of the product, picture-labeling in some instances, and many other factors.

The development or "make up" of an inventory has for a goal, the possession of the right plant at the right time. There are the assumptions that the producer can do the growing job on the item required, at a profit, and that there will be a call for it when it is ready for sale.

With the limited experience we have on the balancing up of a line of container plants it permits me to give you only our ideas of what

should constitute an inventory. This inventory is based on what we believe is suitable for us under our conditions of climate, market, production ability, and all other conceivable factors. We find that we need about 20 per cent of our plants with high color and with novelty attraction. For example, when we think of yellow we think of golden privet. For red we might use *Prunus cistena*, or the red barberry. In conifers, the golden biotas and some of the other off color forms could be considered. These would constitute the first 20 per cent. The second 20 per cent of the inventory would be composed of plants that we call ideally adapted to the canning process. The leading and outstanding example of this is represented by the *Pyracantha*. It could possibly be said that some varieties of cotoneasters could also be more satisfactorily grown in a container than any other way. There are many more plants that could be thought of that naturally fit into this category. Forty per cent should be composed of standard conifers. I know no particular reason for doing this except that we are primarily in the conifer business. Since we seem to have the market for them as well as the facilities for producing them, this seems about right for our situation. The last 20 per cent we are reserving for plants in the larger container such as the 30-pound egg can or the 5-gallon container that doesn't contain 5 gallons. For this category we are under way with a line of flowering crabapples, hawthorns, flowering cherries and selected shade trees.

Now the aspect of the actual growing of a finished crop of plants in metal containers immediately presents a two-sided picture. Facilities, equipment, organization, and efficiency are on one side. The actual cultural procedures of producing liners, potting, handling, fertilizing, watering, and trimming, are on the other. Among the facilities you should have are first, a good location, with an ample water supply. Then there is plumbing and drainage. Specialized equipment will be required to apply water, fertilizer, and insecticides. Your physical plant will most certainly require buildings to do the work in. You will need mixing and conveying equipment for the growing medium, as well as equipment for soil sterilization. For a mechanized operation you will need something under the general heading of a canning machine.

Now, from our experience, it appears that the type and amount of equipment you should have will be governed by the size of the crop you are producing. We have observed that 100,000 plants in containers will not go far in paying and providing for equipment, but 100,000 plants will show you what equipment and mechanization you need. The degree of mechanization will certainly be governed by the individual concern. For example, a canning machine can be rigged at the end of a wheelbarrow and used for a few hundred plants or it can be a fully engineered machine of the type used in the West for turning out multiples of thousands of containers per day. All of the foregoing, be it thorough or sketchy, brings you down to the place where you are ready to pick up the plant, place it in the container and carry through to the finished product.

Let us do some thinking about the plant itself. It needs to be at a certain stage of development in order to keep pace with a timetable for growth. We break our timetable to run in increments of months, as

for example, 14, 18 or 24 months. Others find that shorter intervals fit their needs better. With us, the plants must be the best material out of lots of a chosen age. If there can be advantages gained in their structural development by pre-trimming, that should be done. As people interested in getting a start, we have been using plants grown to two and three years of age, in beds, for canning. These plants require root and top pruning at processing time, they pot or can slowly, and they take time to reestablish. We are simply building up our line with these with the hope of also gaining experience with general growing procedures.

In the future we intend to establish plants in clay pots or plant bands. We believe that good attention to the development of lining-out stock for container growing would go back to the selection of the cutting itself, and to the spacing afforded them in the propagation bench. While we have not had any experience, there are growers working on a trial basis, with the direct canning of unrooted hardwood cuttings and with rooted cuttings directly from the propagation bench. The thing sought here is less loss of time during reestablishment period. Still the most important thing to say about the plant used is that they must be first-run stock, probably produced especially for the job. The reason for using that kind of stock is that they are going to go into an extensive and costly process of maintenance.

A growing medium has to be provided. It has to contain the factors of fertility, aeration, moisture holding capacity and drainage. These are some of the essentials of what it has to have, irrespective of how it is made. We have already had several excellent discussions on the preparation of container mixtures and for that reason I will give only our personal experience without further recommendations. In 1957 we used the 1-1-1 mixture of soil-peat-sand. In this mixture, the soil component only was sterilized with methyl bromide. We found our medium to be suitably sterilized as far as weed seeds were concerned. For 1958, we are planning to use a 1-2-2 mix. We are sterilizing the entire mixture with methyl bromide. Of course, there is much more that can be said on the subject of soil mixtures and their preparation.

In our nursery, plants are canned on a bench under a hopper that feeds down the soil mixture by gravity. Outside of a simple arrangement that drops the can down a hole and positions the rim to table level for filling, and the lifting of the filled can by a foot lever, there is no mechanization of the potting job. The filled cans are moved to wagons by an unmotorized, roller conveyor. The wagons are tractor-drawn to the growing sites where the cans are placed in beds, 11 cans wide, 50 feet long, with $3\frac{1}{2}$ foot aisles.

I will give our entire program for providing fertility at one time. Newly set plants are immediately supplied with 38 per cent nitro-form fertilizer applied by broadcasting. The rate of application is about one teaspoon per one gallon can. After this first fertilization, our plots are fed at 10-day intervals throughout the growing season with a soluble fertilizer having an analysis of 20-10-15. (This is applied at the rate of $1\frac{1}{2}$ pounds per 400, one-gallon cans.) We have encountered need

for adjustments to correct trace element deficiencies in the case of a few varieties. While watering is a matter of judgment, our plants are watered daily during periods of hot weather. For this we set up portable, aluminum irrigation piping with a riser at each of the four corners of the group of six beds. We then distribute the water with part-circle sprinklers directed inwardly from the four corners. Each sprinkler covers a quadrant of 90 degrees. I would like to say that we have been getting by quite satisfactorily with this type of watering system, although this does not preclude the fact that some of the plants will have to be watered by hand.

While it is possible to comment on the routine maintenance and handling of the crop and orders, I will pass on to the subject of winter protection. This is the one factor that will be most influential in determining the future of container growing in the colder climate of the United States. We have mostly wintered over our crop on top of the ground. There are many kinds of plants that have so far wintered with us under the fairly simple process of just banking soil around the exposed sides of the beds of cans after they have been placed together. There are other kinds of plants that require mulch. For this we have been using ground corn cobs. I suspect we are going to have to find out many things, about winter protection, item by item and year by year.

The outlook for large scale production of container grown plants in the cold temperate area is one which will have to undergo a slow, cautious period of development. One of our greatest advantages can come from a very discriminating survey of our list of plants. There is a good inventory of ornamental plants that will grow just as much in an Ohio summer as they will in a California or Texas summer. We have subjects such as yews and spruces, that other areas do not attempt to grow. While large scale production may be a long time off, it will eventually come. Remember it may arrive by methods yet unrealized but I believe the midwest will give a good account of itself.

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MODERATOR TURNER: Now, as I mentioned earlier, we are endeavoring on this panel to present a picture of our container culture about the entire country. To present the next discussion, I would like to bring on the gentleman who is going to give us "The California Concept in Container Production." He is Mr. Walter Lee of the Monrovia Nursery, Azusa, California.

Mr. Walter Lee presented his paper on the production of ornamentals in containers in California. (Applause)