How to Propagate and Grow on a Small Scale

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The International Plant Propagators' Society includes members of varying degrees of connection with nursery production. It is safe to assume that all members love plants and have a strong desire to propagate and grow them. In my position as Executive Director of The Holden Arboretum I am quite removed from the front lines of horticulture since I spend nearly all of my time at work dealing with administrative matters, real estate, fundraising, personnel issues, and a multitude of other things not related to hands-on plant production. These responsibilities lead to a frustrating personal situation since I still think of myself as a propagator and a grower. How do I cultivate my interest in and increase my knowledge of propagation and growing? I do it like so many others in the same predicament: I operate my own part-time nursery which has the two-fold benefit of satisfying my need to produce plants and hopefully some day, bringing some profit into the picture.

Several considerations must be made before starting this kind of venture and are critical to the success of a small, part-time operation. The first and most important consideration is the commitment of personal time. Even a part-time operation is a 7-day-a-week commitment. Willingness to hire help to cover daily watering is essential if you ever wish to take a vacation or to attend a meeting during the growing season. The next decision is willingness to commit the financial resources to an operation that may be several years away from profitability, if ever. I justify my own use of funds as necessary for my psychological well-being because of the personal satisfaction and stress reduction I receive. I admit that most growers cannot look at it this way but I tend to look at my operation as a hobby that hopesto make money.

Determining what to grow and the type of production (whether in-ground or container) are the next critical considerations. What can you grow well for which an unfilled demand exists? I have found in my situation that native plants, especially the herbaceous and wetland species are in demand, and are becoming more popular all the time. I chose to specialize in native herbaceous species and native medicinal herbs. Aside from a few ground beds, I grow most everything in containers. I have a shortage of good growing ground so container culture works better for me. I have considerable experience, gained by part-time growing over the years, in container growing and have developed by trial and error the growing mixes that work best for my plant types and watering practices. In-ground growing, if you have suitable soils, has an advantage over containers for watering and overwintering, but has the main disadvantages of weed control, shipping, and harvesting.

Propagating and growing on a small scale requires some immediate decisions to be made. Either you grow only a few plants of a wide range of species or many plants of a few. The answer to this dilemma is found in your analysis of the local demand. My own analysis was anecdotal and was made by observing sales at our annual Arboretum plant sale and by talking with avid gardeners. Consequently I grow a total of about 1500-qt pots of 25 to 35 native species per year. This low-volume approach doesn't always work well when trying to meet demand where larger quantities are required. I suspect the most appropriate way to begin is to grow larger

quantities with fewer species involved, but that again should be based on analysis of the local market.

Growing facilities are another consideration. Fortunately, poly houses are relatively inexpensive and easy to build and operate. Space considerations forced me, for the time being, to construct a large set of cold frames, instead of a poly house, in which Ido all my seed germination, growing, and subsequent overwintering. This is the second set of cold frames that I have built and I have learned from experience the materials and construction methods that are most successful for me. The cold frames are unheated and are built of 2× treated lumber and lined with rigid insulating foam that is covered on both sides with aluminum foil. The covers are built of 1× treated lumber and glazed with twin-wall polycarbonate panels. Shade is provided by rolled lath salvaged from an old Lord and Burnham greenhouse. Other details of orientation and depth are standard and follow recommendations found in numerous publications.

Another very important consideration is the type of propagation. Because of the part-time nature of the operation and the nature of my facility I have to limit myself to seed propagation (a special interest of mine) and division of existing plants. Propagation by cuttings is not practiced, primarily because of lack of the right equipment, and the fact that the plants that I grow are not necessarily amenable to cuttings. All seeds are germinated in the coldframe as uncovered flats or pots under the sash. Occasionally, plastic domes are placed over flats to maintain moisture.

Growing media are mixed on site in an electric concrete mixer (which I also use to mix concrete) from bagged components obtained from a local greenhouse supply company. Opened bags are stored in plastic trash cans with lids. By maintaining components on site, specific mixes can be created to best suit the needs of a wide range of plants. I don't do enough volume of production to justify bulk deliveries of media components, so cost is necessarily increased to accommodate smaller production. As the size of the operation grows bulk deliveries may be justified with a concomitant reduction in per unit cost.

Another consideration is obtaining the appropriate permits and inspection certificates. By doing this work early in the process you may eliminate delays in selling and shipping. I avoid one big potential problem of shipping to other states by using only soilless mixes. Weed control is accomplished by hand and insect and disease control will be handled by spot treatments if needed. To date, no treatments have been necessary. I believe that insects and diseases have been non-existent due to the rigorous sanitation I practice and the selection of native plants with few, if any, natural pests. Once I begin to sell crops and am required to use chemical pest control I will have to become a licensed pesticide applicator in my state. I have not yet reached this point.

I have yet to sell my first plant. Plants produced to this point have been used in landscaping my home, creating stock blocks for future propagation, donated to The Holden Arboretum annual plant sale, and donated to my church for landscaping and distribution at church events. My first sale will be to a local orchardist who asked to have a specific crop produced. These will be delivered this fall assuming crop success. All other potential sales will be the result of word-of-mouth advertising. A price list is still a few growing seasons away.

The need to propagate and grow plants is deep-rooted to both me and our members. To keep abreast of our industry is important even if we are not directly involved in

the commercial end of our profession. Part-time and small-scale growing is an avenue that is both emotionally enriching and potentially financially rewarding. I estimate that my own operation is approximately two or three growing seasons away from the break even point. Since my current objective is personal satisfaction I am not yet overly concerned about profit. However, I will soon reach a point where I must either remain small with little expectation of economic success or I must increase production to a level where profit is assured (with as much assurance as possible in an agricultural operation). However, with the right effort and the commitment oftime and minimal resources, success as a small-scale grower is possible.

Blending Slow-release Fertilizers for Container Nursery Culture

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Two "manufacture-blended" [(test formula 23N-2.6P-7.5K (23N-6P_2O_5-9K_2O) and test formula 19N-2P-6.6K (19N-5P_2O_5-8K_2O), both 8-9 month release type] and two "custom blended" [3-4 month Sierra 17N-2.6P-10K (17N-6P_2O_5-12K_2O) or 8-9 month Sierra 17N-2.6P-8.3K (17N-6P_2O_5-10K_2O)] mixed with quicker-releasing Osmocote [14N-6P-11.6K (14N-14P_2O_5-11.6K_2O)] controlled-release fertilizers were compared with three unblended 3-4 month or 8-9 month standard industry types. Container-grown dogwood (*Cornus alba* 'Argenteo-marginata'), mock orange (*Philadelphus virginalis* 'Minnesota Snowflake'), and weigela (*Weigela florida* 'Variegata Nana') grew similarly or marginally different in two different media with the four best-performing treatments: Test formula 23N-2.6P-7.5K (23N-6P_2O_5-9K_2O); the two Sierra-Osmocote blends; and unblended 3-4 month Sierra. With unblended and blended 3-4 month Sierra, 30% less N was used, and both dogwood and wiegela grew better with the blend.

INTRODUCTION

Many types of controlled- or slow-release fertilizers are available to the nursery industry. The major nutrients in these fertilizers are typically coated. While the type of coating and/or thickness usually determine the release characteristics, mixtures of quicker- and slower-releasing types (custom blends) have been used to alter the release pattern (Lumis et al., 1993; Hicklenton and Cairns, 1992; Murray et al., 1996). In some recent formulations, easily leached nutrients such as N are coated (controlled release) while others such as P and K are blended in but not coated. These "manufacture blends" are less expensive than traditional all-coated types (industry standards) (Hulme, F.D., private communication).