

## Challenges Faced by an Arboretum Propagator

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To understand the challenges faced by the arboretum propagator, one must understand what an arboretum is and the mission it serves. Once this is understood, it will be clear that the propagation undertaken by an arboretum propagator is driven by very different goals than those of the commercial propagator. The goals that follow the mission are only part of the equation. Other challenges arise with the aging or maturing of the collections within the arboretum. This presentation will address the specific challenges I've faced as propagator at the Washington Park Arboretum, located in the city of Seattle.

### BACKGROUND/DEFINITION

The Washington Park Arboretum, is located on a 200-acre site. The first plantings occurred in 1936, bringing many members of the collection to nearly 50 years old today. By definition, an arboretum is a living museum of woody plants for education, conservation, research, and display. For the Washington Park Arboretum, specifically, the mission is to utilize woody plant material that is suitable for the Pacific Northwest in fulfilling these goals. Of these mission goals, conservation or preservation of the living collections offers the greatest challenge to the propagator.

### HOW IS PROPAGATION CHALLENGED IN THE ARBORETUM?

**Preservation of Genetic Diversity.** There are approximately 5000 different plants in the Arboretum collection. To maintain the strength and integrity of these collections new plants are acquired each year. For assurance of its identity as well as its origin, plant material is obtained from well-documented sources, whenever possible. And "wild-collected" seed from native populations is the primary choice.

Most new material is received as seed from the *Index Seminum*, a public garden, free-seed exchange program. Many taxa are obtained from exotic locations, such as South America, Asia, New Zealand, and Europe. Due to the fact that many of the taxa are uncommon, little or no information is written in the literature pertaining to the species sent. Therefore, propagation treatments are done mostly by trial and error, based upon whatever information might be found at the genera level.

Seed sent from the *Index* can vary widely as well. Some seed is fresh and well-identified and becomes a good performer. Other seed, however, is old (at least 2 years) and the quantity small (3 to 5 seeds per packet). This leaves little to no room for testing the seed and different treatment lots are greatly restricted.

The wide range of plant material that is handled is a challenge in propagation. The plant production program handles about 250 new seed accessions per year. When seed numbers permit, a range of treatments are tried on seeds where no information on propagation is found. Once germinated, seedlings are grown on in a fairly standard, uniform manner, unless specific information is found concerning the cultural requirements of the plant.

**Preservation of the Collection.** Conservation of the existing mature collections is focused primarily on one-of-a-kind, wild-collected accessions. Of these plants, those being suppressed by native plant growth or not thriving for some other reason are high on the list for renewal. Natural disasters (the winter storm of 1989-90 and the wind storm of 1991) as well as vandalism play a minor part.

Today in the Washington Park Arboretum, there exists a dominant native canopy of trees, consisting mostly of big-leaf maple and western red cedar. This suppressing overstory simply out competes many of the collection plants, limiting their growth or deforming their shape. There is also an old field nursery in existence that was planted more than 10 years ago. Most of the nursery "stock" is too large to move without a tree spade (and then, too difficult to get to), or else, it is too deformed from the close spacing of old nursery rows to make good collection specimens.

These conditions dictate a long list of collection plants in need of repropagation. Seed from these plants is usually out of the question, since it has most likely been hybridized by other plants in the surrounding area. Vegetative propagation is the preferred method, but not always a simple solution.

## **METHODS USED TO MEET THE CHALLENGE**

The maturity of the specimens and the fact that most are also in a stressed state produce very little good vegetative parts for repropagation. Cuttings are tried on a scheduled basis according to time of year. If a plant is particularly difficult to root, extreme measures may be taken to reproduce it. Severe pruning measures are taken to induce new growth, if possible. This allows for more juvenile material to come on. If this method fails, or if this practice is too drastic, then other methods may be attempted.

Air-layering has been tried on *Poliothyrsis sinensis*, a deciduous tree from China, with success. For difficult-to-root evergreen oaks and magnolias, velcro strips and rooting hormone were applied to terminals during the growing season. Root nodules resulted and one magnolia rooted as a result; although, this practice was not very successful.

When all of these measures fail, a nursery specialist may be employed to propagate by grafting, as was done this past year with the Japanese Maple collection. As a final measure, when all attempts for repropagation fail, new plant material is obtained either via the *Index Seminum* or from a reputable nursery source.

## **THE ROLE OF RECORD KEEPING**

Detailed records of all propagation activities are kept on BG-base, a botanical garden database widely used by public gardens throughout the U.S. as well as in parts of Europe.

Accession details, including information in regards to source are integrated between the arboretum records office and the plant production program, located at the Union Bay site of the Center for Urban Horticulture. The propagation records include details on treatments given, environmental conditions used, as well as the end results. These files are used for future reference in the plant production program itself as well as for reference to others who make inquiries on how to propagate these unfamiliar species.

## ALTERNATE STRATEGIES

**Role of the Nursery Manager.** For the Washington Park Arboretum, plant distribution serves as a means of getting plant material off-site and into the market, as well as insuring the ongoing existence of the plants. Plant materials not readily available through the trade are distributed to commercial nursery managers upon formal request. A distribution program of surplus plants from the nursery are made available to various units of our support group, the Arboretum Foundation, as well as to other public institutions in the Seattle area. Information is kept on the materials sent out, in order that future reference can be made, in the case that all original plant material is lost from our collection. Arboretum policy allows for seeds or cuttings to be exchanged with sister institutions at no charge; whereas, nursery managers are asked to make a donation to help defray the costs of handling and shipping. The barter system has proven to be useful as well, wherein a nursery exchanges plants that are desired by us, in lieu of payment.

**Networking.** The challenges faced by the arboretum propagator can seem formidable at times. But, perhaps, life will become simpler in the future. Possibly, more associations between public institution and private industry will occur. These relationships may become more creative and could prove worthwhile for both sides.

Today, there are more native plant propagators/restoration ecologists who are striving to achieve the same goals of gene preservation as the arboretum propagator. Shared information on propagation techniques may work to benefit both.

New, improved ways of communication (World-Wide Web, bulletin boards, newsgroups, etc., located on the Internet) will make networking easier and faster. The isolated propagator, who works out of his greenhouse alone could become as extinct as the dinosaur.

Certainly, meetings of professional propagators involved in all types of propagation can open the door for new information to be exchanged and new ideas of methodology and networking to occur.

In conclusion, the challenges of propagation for the arboretum propagator are sometimes great and difficult to solve. Instead of profit-motive and high production yields, preservation of genetic diversity and location of new wild-collected sources become the main concern. For all of us who work in an arboretum, however, there is satisfaction gained in witnessing the renewal of old and the introduction of new plants into the garden. Seeing these results, makes meeting the challenges of propagation in an arboretum worthwhile and charges us up for the next round to come.