

**WOODY PLANT INTRODUCTION PROGRAMS**

By

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Administration

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When I put out a good tree it is better than  
the best law ever passed or the best symphony  
ever written or the best political speech. You  
know it's a creative thing that touches the  
lives of many, many people.

Willet Wandell

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## ABSTRACT

Plant introduction is often a primary goal of profit and not-for-profit horticultural institutions. In the past many introduction programs were designed to collect, test and select superior woody plants, but did not include a structured system to promote introductions to the wholesale or retail nursery trade. This study examines more recent programs that include a strong promotional component.

Woody plant introduction programs in the United States and Canada are analyzed in this research paper. These programs contain a combination of components including testing, selection, registration, patenting, trademarking, royalty collection, promotion and marketing. The purpose of the paper is threefold. First, it is to provide an understanding and appreciation for a variety of introduction programs through an examination of their components and organizational models. Second, it is to supply information on designing and implementing a new program or modifying an existing program. And third, it is to direct the reader to sources for more information on this topic.

Research methods used to collect data on this subject were primarily site visits and telephone interviews with initiators and cooperators of these programs. Information on each program has been standardized to provide the reader with a basis for comparison.

Since no two woody plant introduction programs will be exactly alike, each should be tailored to serve the needs of the institution, the geographic region, and the horticulture industry. The design process begins with an examination of the institution's mission statement and available resources. Planning includes the preparation of written goals and objectives, five year budget and program model. A working knowledge of plant registration, patenting and trademarking is essential. The design should include a promotional program which maximizes resources and targets a large audience. Open communication and participation with the horticulture industry should be fostered. And finally a strong leader, with an understanding of the introduction process, contacts in the horticulture industry, and energy and enthusiasm, is critical to the success of a woody plant introduction program.



## INTRODUCTION

Numerous individuals and institutions in the United States and Canada are actively involved in research to identify and select superior woody plants for the landscape. However, only a few have a bona fide plant introduction program or scheme, which includes a mechanism for the promotion of these introductions.

In this research paper plant introduction is defined as the process whereby plants from clonal selections or breeding are tested, evaluated, selected, registered, and promoted. Plant introductions may be patented and/or trademarked and royalties collected. For definitions of these terms, as they pertain to this research, see page 6.

A more traditional use of the term plant introduction refers to the process of importing plant materials into the United States. Although importation is the source of many plants for testing in plant introduction programs, it is not the author's intention to examine this process.

In order to evaluate each plant introduction program, a measurement of success must be established. In this paper the word success will be defined as the achievement of specified goals. Each institution's plant introduction program mission or purpose will be used as the basis for determining success. Goals vary considerably. Although plant introduction is the one common objective, the actual quantity of new introductions is often of lesser importance than related benefits, such as; making a profit, providing improved plants for the consumer in a specific region, gaining recognition for the institution, staff or cooperators, or improving industry relationships.

Since relatively little has been published on plant introduction programs, library research yielded minimal information. Data for chapters 1 and 2 was collected primarily through site visits and telephone conversations with initiators and cooperators of these programs.

The goal of this research paper is to provide information for not-for-profit institutions that want to design a woody plant introduction program or improve a current program. Through the examination of profit and not-for-profit models, institutions can gain an understanding and appreciation for the process involved in implementing an introduction program.

This paper is divided into four sections. Chapter 1 examines and analyzes profit woody plant introduction programs using examples from commercial nurseries. Chapter 2 examines and analyzes not-for-profit woody plant introduction programs organized by arboreta, botanical gardens, universities and state and federal government. Chapter 3 provides guidelines for developing or modifying a woody plant introduction program and chapter 4 is a directory of selected plant introduction programs in the United States and Canada.



## CHAPTER 1

### SELECTED PROFIT WOODY PLANT INTRODUCTION PROGRAMS

Chapter 1 examines profit plant introduction programs. In an effort to categorize profit and not-for-profit programs, they are separated into groups based upon common components given in figure 1. Components examined include profit or not-for-profit status, breeding versus clonal selection, testing, cooperative evaluation, plant registration, patents, royalties, trademarks, promotion and marketing.

The profit group includes commercial institutions that receive financial gain from the sale of their plant introductions. Since their goal is to make a profit on all plant sales, their approach is different and may provide valuable insight for a not-for-profit institution designing an introduction program. In order to survive commercial nurseries must make a profit on sales. One way to do this is to specialize in a specific group of plants. Two programs examined in this paper are Conard-Pyle Company, specializing in roses, and Discov-Tree Research and

Program Name	Profit	Not-for-Profit	Breeding	Clonal Selections	Testing	Cooperative Evaluation	Registration	Patents	Royalties	Trademarks	Promotion	Marketing
Discov-Tree Research	X			X	X	X		X	X	X	X	
Conard-Pyle Company	X		X		X		X	X	X	X	X	X
U.S. National Arboretum		X	X		X	X	X				X	
Minnesota Landscape Arboretum		X	X		X	X	X		X		X	
Univ of British Columbia Bot Garden		X		X	X	X	X		X		X	
Saratoga Hort Foundation		X		X	X		X				X	
USDA Soil Conservation Service		X		X	X	X					X	
NC-7 Ornamental Plant Trials		X		X	X	X						
Brookside Gardens		X		X	X	X	X					
Texas Experimental Station		X		X	X		X			X	X	
Arnold Arboretum		X		X	X						X	
North Carolina State University		X		X	X						X	

**Figure 1. Components of Woody Plant Introduction Programs**  
(Definitions of terminology on page 6)

### Definitions of Terminology used in Figure 1.

**Profit** - program operated by a commercial institution which receives financial gain from the sale of its plant introductions.

**Not-for-profit** - program operated by an institution which has been granted tax-exempt status from the Internal Revenue Service. Funds generated from introductions are returned to the program for operating expenses; no net profit is realized.

**Breeding** - majority of plants for the program are the result of plant breeding.

**Clonal Selection** - majority of plants for the program are clonal selections.

**Testing** - an internal evaluation system, whereby data is collected by the initiator to determine the potential merit of the plant.

**Cooperative Evaluation** - an external evaluation system, whereby data is collected by cooperators to determine adaptability to a geographic region, and/or other characteristics.

**Registration** - plant names are verified, validly published and registered with the appropriate authorities.

**Patents** - plant patent rights are obtained for introductions through the U.S. Patent Office. Other institutions cannot propagate the plant for 17 years, unless permission is granted by the patentee and/or royalties are paid.

**Royalties** - royalties are collected from growers for every propagule of the new introduction; may be in association with a plant patent.

**Trademarks** - names of plant introductions are routinely trademarked by legally registering a name, phrase or symbol with the U.S. Department of Commerce. Trademarks cannot be used by other institutions and are renewable every 20 years.

**Promotion** - a variety of methods are used to make the wholesaler, retailer, and consumer aware of the introduction. Advertising is done using brochures, press releases, lectures, displays and giveaways.

**Marketing** - program develops a targeted plan which identifies the needs of the consumer and attempts to show how plant introductions solve a problem or fulfill a need. Plant patenting and trademarking are an important part of this scheme.

Development specializing in shade trees. Both programs have a strong promotional element. They rely heavily on the use of patents and trademarks for royalty collection to offset some of the costs incurred in promotion.

Due to the great diversity of profit programs involved in plant introduction, it is difficult to generalize on the resources needed. However, a few components are so vital to success in introduction, that they are worth noting. First, a program must have access to a wide range of plants for testing, either clonal selections or products of breeding. A thorough system for testing, and an individual or team experienced in the evaluation and selection of superior plants is important. Second, an understanding of the market place and needs of the wholesaler and retailer are critical. A professional promotional or marketing campaign will greatly increase the success of the introduction. And last, a profit program must have a good comprehension of the procedures used in this country for naming, registering, patenting and trademarking plant introductions. If these procedures are used effectively, dollars from the collection of royalties can offset the high costs of promotion.



Conard-Pyle Company  
Rose Introduction Program

Introduction

The Conard-Pyle Company is a large wholesale nursery located in West Grove, Pennsylvania with additional growing fields in Arizona and California. It was incorporated as a mail order firm in 1897 and began to specialize in roses in 1908. Today the company continues to be a leader in the introduction of roses, and also sells a wide range of woody plants. Conard-Pyle is involved in testing and promoting hollies, rhododendrons, azaleas and other woody shrubs. This paper will focus on Conard-Pyle's rose introduction program which includes the components of testing, plant registration, patents, royalties, trademarks, promotion and marketing as illustrated in figure 2.

Since 1919, 305 roses have been introduced at Conard-Pyle (see appendices, page 170). Over the years the company has established working relationships with numerous rose breeders in Europe and has been actively involved in the establishment of the All-America Rose Selections.

Facilities at the Pennsylvania headquarters include an acre of greenhouse space, an acre of work and storage

## Plant Sources:

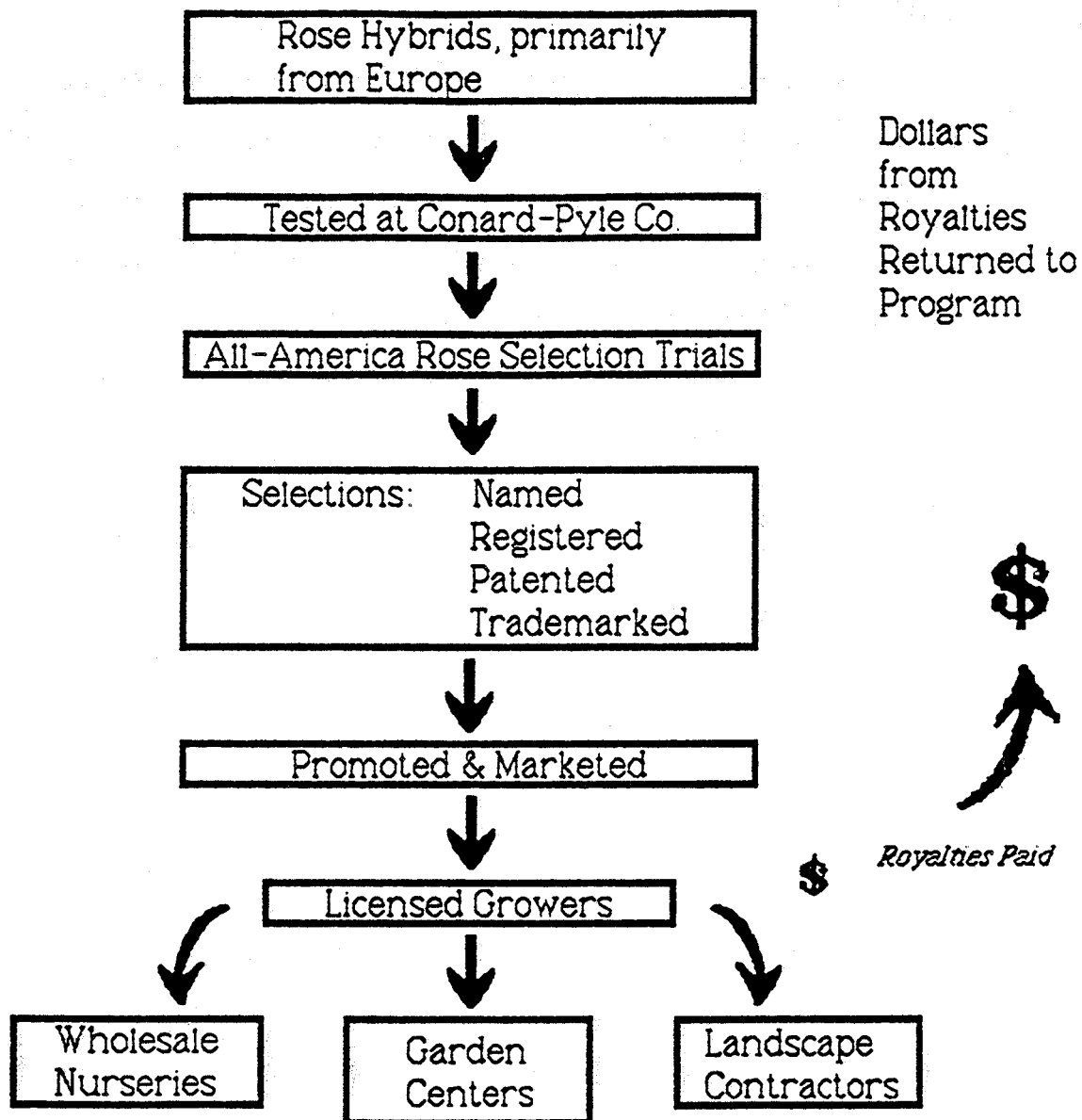


Figure 2. Conard-Pyle Company Program Model

buildings with 10,000 square feet of refrigerated rose storage and 16,500 square feet of shipping facilities. Additionally 30 miles of polyethylene covered houses are used for over wintering. Full time staff is approximately 100.

### Purpose

Conard-Pyle does not have a written goal statement. As a commercial nursery, one of the implicit goals is to make a profit. In the early 1900s Robert Pyle, one of the first owners, made the decision to specialize in roses. He recognized that the rose was America's most popular flower and would always be in high demand.

Today Conard-Pyle is committed to produce new and better rose varieties. The goal is to produce a rose that is good and fulfills a market need. There have been years when only a few roses were introduced.

### Plant Sources

Conard-Pyle is not directly involved in plant breeding. However, their plants for testing come primarily from rose hybridizers in France and other parts of Europe. Approximately 35 different sources supply hybrids for testing. In recent years strong ties have developed with

House of Meilland, a rose producer in France, resulting in the new Meidiland series of roses. Budwood from each cross is sent to Conard-Pyle, understock is grafted and plants set in the fields for testing.

### Testing

Each year approximately 600 accessions, 10 plants of each, are tested at the West Grove location. The owners make decisions on testing and selection. They do not have a written evaluation system; their own observation, as a result of years of experience, is the primary method for selection. When plants are in flower, they are observed daily, otherwise weekly from early June through September.

After the first growing season, approximately 30 hybrids are selected for further testing. Sixty plants of each accession are propagated and planted in a new test area. The remaining 570 plants are further observed for several growing seasons. Other promising plants may emerge later from the original core group.

During the next year the 30 accessions are carefully watched and evaluated, 12-15 plants are chosen for a third cut and the process continues for one more year. At the end of the fourth season, 6-8 plants are

chosen for the All-America Rose Selections (AARS) trials with 1500 plants of each accession produced for the trials. These plants are sent to 21 official test gardens in the U.S. and Canada and are further evaluated for two years. Plants which receive top scores may be considered for the All-America Rose Selections Award. If Conard-Pyle identifies a superior rose that does not receive the AARS award, it will be introduced directly through Conard-Pyle Company and heavily promoted.

Conard-Pyle has been active in the All-America Rose Selections since it began in 1938. This not-for-profit organization was designed to test, select and promote superior roses in the United States and Canada. Conard-Pyle has one of 22 official AARS test gardens and has several individuals on staff who are official AARS judges. From 1938 to 1987, Conard-Pyle Company has introduced 30 roses which have won the AARS award. For more information on AARS see Chapter 2, page 145.

### Introduction Procedures

New rose introductions are named by Conard-Pyle or their French counterparts. Cultivar names are registered with the appropriate registration authority at the All-America Rose Selections. Prior to 1978 most of

Conard-Pyle's cultivar names were in English and descriptive in nature or derived from proper names. Some examples of their early cultivar names are 'Perfume Delight', 'Mister Lincoln', and 'Angel Face'.

Since 1978, Conard-Pyle or their French affiliates, have selected non-descriptive cultivar names, which are not in English. Examples include 'Mejikatar', 'Schobitet' and 'Poufli'. These commercially unattractive cultivar names make it difficult for other nurseries to market their introductions under the cultivar name. For example, it would be hard to create a consumer demand for a plant named Rosa 'Meidomonac'.

When Conard-Pyle switched to these non-descriptive cultivar names, they began to trademark names for each plant. From 1978 to 1987 they have trademarked 27 of their 31 introductions. Each trademarked name is descriptive and in English. For example Rosa 'Meiponal' has the trademark Sunny Sunblaze, Rosa 'Meifinaro' is trademarked American Independence.

Each cultivar has been heavily promoted by Conard-Pyle using the trademark name. If another nursery wants to use the trademark name they must sign an agreement with Conard-Pyle and pay royalties for the use of the name.

Since Conard-Pyle has invested heavily in the promotion of each introduction, this is one way to recoup some of those costs.

This practice of selecting non-descriptive cultivar names and descriptive attractive trademark names is becoming common practice in the nursery industry in the U.S. and abroad. Monrovia Nursery Company, in Azusa, California uses this practice as well. (See page 161, for more information on Monrovia Nursery.)

#### Plant Patents

Since 1953 Conard-Pyle has patented all of their plant introductions. Plant patents are taken out for the plant breeder. Conard-Pyle does all of the paper work for the originator and asks that the patent be assigned to Conard-Pyle. The originator receives a share of the royalties for each plant sold.

Descriptions for each patent are written by the owners of Conard-Pyle, with information and photographs supplied by the French affiliates. A lawyer drafts the patent application and follows through to make sure the patent is approved.

New plant introductions are both patented and trademarked. Licensees pay royalties to Conard-Pyle for each propagule produced and for the use of the trademark. At the end of 17 years, when the plant patent expires, Conard-Pyle can continue to collect royalties on the trademark as long as there is a market demand. This double protection allows for a high degree of control on these plants. In some cases Conard-Pyle has opted to release the trademark name and make it available to others.

#### Promotion

Every rose introduction is heavily promoted by Conard-Pyle. Trademark names are carefully selected with an eye for promotion. When a plant is released a flood of advertising goes to the press, trade magazines, professional journals and garden writers. Annually an attractive, colored catalog and brochures are produced, featuring their introductions (see pocket material). Some of Conard-Pyle's introductions have been featured in retail mail order catalogs. Wayside Gardens spring 1988 catalog featured Conard Pyle's Cary Grant TM Rose on the back cover. In addition plants are displayed at nursery trade shows. The biggest promotion of all comes through the announcement of the AARS winners. As indicated, Conard-Pyle has had 30 AARS winners. These plants are so heavily



promoted by AARS, that as soon as the winner is announced at least 100,000 plants are sold the first year.

### Marketing

In the past, Conard-Pyle has used promotional techniques to advertise plants, as described above. Their first marketing campaign began last year and is called Meidiland. The program took two years to design and cost \$70,000 for the first year of promotional materials.

The program is based on a market need. After years of working with the wholesaler, retailer and consumer Conard-Pyle felt that the industry was ready for a new product. They believe that consumers want fool-proof plants, which are attractive year round, require minimum care, are small enough for a small yard and tough enough to survive urban conditions. Wholesalers want plants that propagate and produce easily in containers and garden centers and landscape contractors want plants that satisfy customers.

Keeping this information in mind, Conard-Pyle decided to market a new line of shrub roses that met all of the above criteria. They carefully selected four roses from the House of Meilland introductions. However, since they

did not feel that the market would readily embrace another rose introduction, they decided to call the plants "hybrid flowering shrubs" instead of roses. Promotional materials were designed, including brochures, posters, displays and banners.

This marketing program was designed to generate interest before the plants were available. The product concept was marketed the first year of the program. Meidiland campaign began June 1, 1987 with an announcement in American Nurserymen. A simple advertisement said "Meidiland (say: May-D-Land) - Conard-Pyle Co." The second month a similar ad was featured, with an additional phrase: "Hybrid Flowering Shrubs." A full advertisement on the product line appeared in the publication the third month.

While curiosity was peaked through these advertisements, a display featuring Meidiland was used at nursery trade shows across the country. Unlike traditional displays, a 10' x 10' poster showed each new introduction; live plants were not used. In the second phase of the campaign landscape architects were targeted; slide shows, presentations and handouts explaining how to use the new introductions were given at national meetings. Garden Centers and consumer will be targeted in 1988. In addition, major plantings of the Meidiland introduction will be

placed around the country. A large display is currently featured at Disney World.

Not only has the Meidiland series been marketed different from other roses, the producers are handling plants in the same manner as they would other woody shrubs. These plants are not being sold to Conard-Pyle's rose licensees, instead they going to Garden Centers where they can be effectively displayed and promoted. Unlike most roses which peak in sales the first year they are introduced and usually have a market life of 10 years, Conard-Pyle feels that these plants will follow a pattern similar to other woody plants. The first years may be slow in consumer acceptance, with a gradual build up of momentum on the market year after year; market life is not limited to 10 years.

### Conclusions

Conard-Pyle's rose introduction program has met its stated goal to introduce new and better roses. The company has established a reputation for producing quality roses and is a leader in the All-America Rose Selections. Over 300 new introductions have been made since 1919, of which 28 cultivars have received the AARS award for superior roses. In addition the new Meidiland series includes

improved shrub roses which fulfill a market need.

The success of this program is the result of several factors. Numerous contacts throughout the world with rose hybridizers allow Conard-Pyle to test a large pool of hybrids annually. The testing process is thorough and staff have the expertise needed to select superior plants. In addition, the company has a good understanding of the market and knows what will sell. They are not afraid to take risks and try new, innovative approaches to introduction.

Conard-Pyle has a good understanding of the patent and trademark system in this country and is careful to legally take full advantage. However, their use of non-descriptive cultivar names and descriptive trademark names, as described in the previous section, has resulted in controversy. Although this practice is used in many other industries, it has created confusion in the botanical world. Even though each plant is registered with the appropriate authority and has a cultivar name, the only name that is used extensively for the plant is the trademark name. In many cases, over time, the trademark name becomes confused to the point where the TM symbol is dropped. Eventually the name is written in single quotes, a form that delineates a cultivar name.

Discov-Tree Research and Development, Ltd.

Introduction

Discov-Tree Research and Development, in Oquawka, Illinois, focuses exclusively on the introduction of shade trees. It was organized in 1981 as a sole proprietorship and incorporated in 1986. The director began compiling data on superior shade trees in the late 1940s when he worked as a research forester. In 1954 he entered the nursery business and made his first plant introduction in 1974.

Thirty six plants have been introduced through the program since 1974 (see appendices, page 182). Testing and research are done at two test sites, of 23 acres, in Oquawka. The full time staff is four; a director and additional researcher involved in testing and selection, an assistant and secretary. Initial capital for the first 18 months of the program was provided by the director. Currently the program is self-supporting through the collection of royalties. Program components include clonal selection, testing, cooperative evaluation, patents, royalties, trademarks and promotion as illustrated in figure 3.

## Plant Sources:

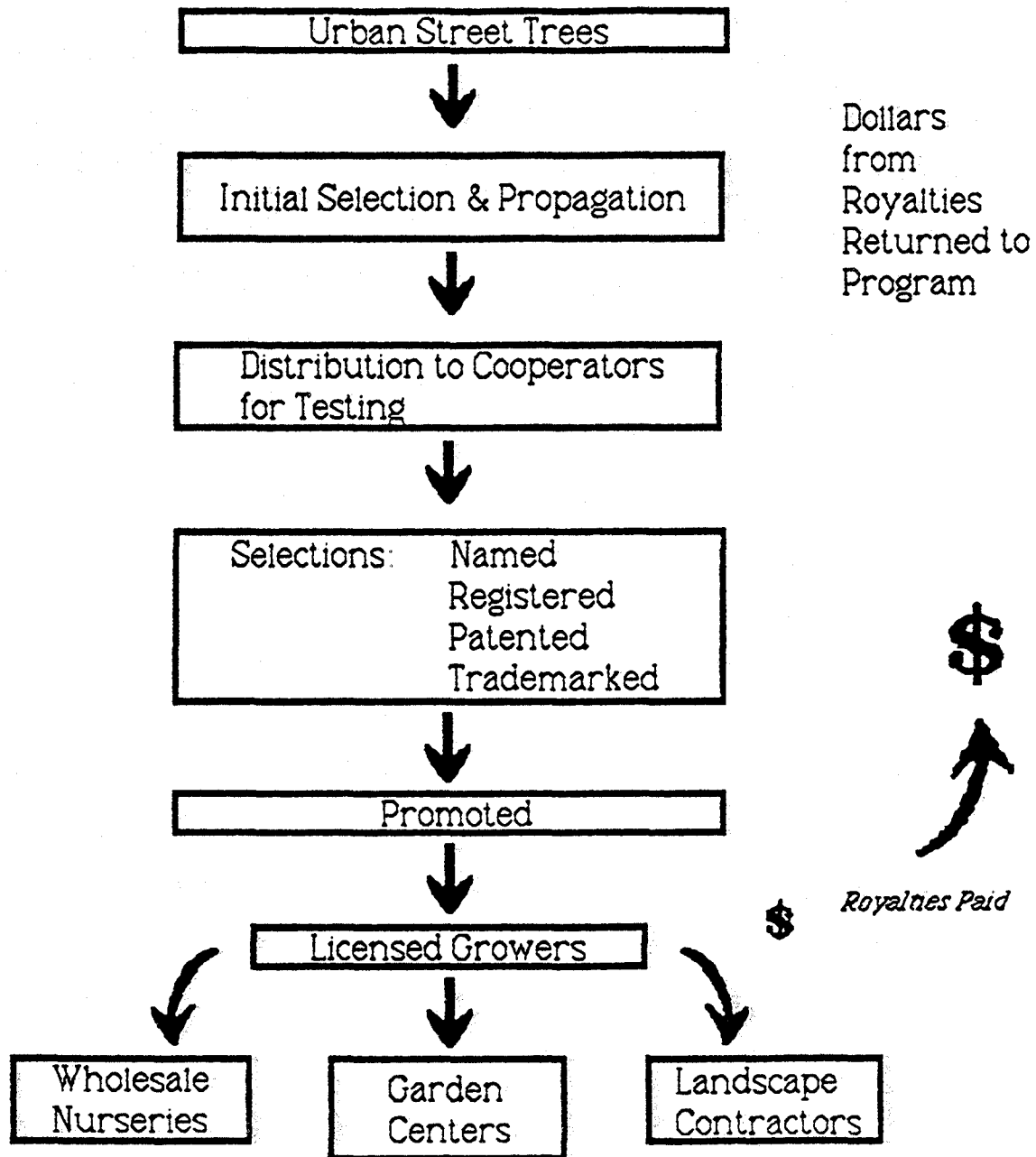


Figure 3. Discov-Tree Research Program Model

### Purpose

There are four written objectives for Discov-Tree:

- 1) The selection of apparent superior plant cultivars
- 2) The testing and proving or disproving of same
- 3) Introduction of acceptable plants
- 4) Promotion to encourage continued propagation, marketing and use (Discov-Tree 1987).

An additional goal, although not explicitly stated, is to produce enough revenue from the collection of royalties to make the program self-supporting. A long-term goal is to establish a national shade tree research foundation.

### Plant Sources

Plants selected for testing are from trees observed in numerous urban settings across the country. Sites may include urban street tree populations, road plantings, cemeteries and fence rows. Sources for materials are far ranging from the upper peninsula of Michigan, south to Tennessee and South Carolina. In addition, professionals bring promising plants to the researcher's attention.

### Testing

Shade trees which show promise are observed on site 3 to 30 years. Although no written system of evaluation is used, both researchers have certain criteria they keep in mind to determine the plant's merit. Of prime importance is leaf thickness, leaf sheen, density of the tree crown, good branch angles and fall color. Additional features such as winter form and bark characteristics are also examined. Trees must have more than one superior feature before they are considered for selection. Prior to introducing a plant, Discov-Trees talks to commercial growers to see if there is a need for the selection. The researchers have found that there is no point in producing a tree no one wants.

Plants which show promise are propagated and further evaluated. To be a successful introduction a tree must reproduce the desirable characteristics found in the parent plant and be easy to propagate and transplant. In addition it must be insect and disease resistant and profitable for the nurserymen. Some of this research is contracted to other nurseries and tissue culture labs.

### Cooperative Evaluation

Once superior trees have been selected and propagation techniques resolved, plants are sent to



numerous cooperators at test sites across the country. Cooperators include arboreta/botanic gardens, universities, landscapers and other nurserymen. Discov-Trees tries to select cooperators who already have a program in place and can give these trees a fair test.

Discov-Trees selects plants for each cooperator based on its climatic range and sends 3 to 10 plants of each accession for testing. Cooperators do not fill out any standard written evaluation form, although they are expected to make observations about hardiness, adaptability and ease of nursery production. The test period is approximately three years.

Without a standardized evaluation form, there have been problems getting valid results back from cooperators. Due to variations in test sites and growing procedures it is difficult to interpret results. Currently Discov-Tree is designing a standard evaluation form and writing a memorandum of understanding to make sure plants are handled properly in the program (Welsh-Wandell 1988).

### Introduction Procedures

Plants selected for introduction are named and trademarked and/or patented. Each plant has its own

distinct logo which incorporates the plant's name and is trademarked. Only two of the introductions to date have had their names registered. The other introductions were patented and trademarked under the same name. This practice is one which the Patent and Trademark Office in the U.S. Department of Commerce expressly forbids and the International Code of Nomenclature for Cultivated Plants strongly discourages. When this occurs, great confusion is created in the botanical world regarding the correct nomenclature for the introduction. For additional information on trademarks see Chapter 2, page 151.

Discov-Tree is aware that proper procedures were not used in patenting and trademarking and has indicated that new introductions will have different cultivar and trademark names (Welsh-Wandell 1988).

Plants are sold through 36 licensed growers across the country. Their progress is carefully monitored and sites are visited once a year by Discov-Tree. Licensees are selected by an advisory board for their integrity and business ethics. They are encouraged to use Discov-Tree promotional materials and agree to pay royalties on each propagule and collect royalties from wholesalers. Also they must agree to purchase and distribute plant patent tags for every plant.

### Promotion

Plants are promoted through numerous channels at four levels; primary growers, secondary growers, landscape architects, contractors and garden center operators and the consumer. Excitement is generated for these introductions at all levels of the industry.

Discov-Tree provides numerous promotional materials for their licensees. Each plant has an official tree description which licensees are encouraged to use in their catalog. A four page color brochure for each introduction is sold to licensees for 3 cents a piece (see pocket material). Logos, in several sizes, are available for advertising and can be used in catalogs and mailing pieces. Colored slides of each introduction are sold for 65 cents each. News releases are prepared for each plant and available free of charge.

### Conclusions

Overall the program is meeting its stated goals and has introduced a large number of shade trees with superior characteristics such as thicker, glossier leaves, which are not subject to leaf tatter and improved overall form and fall color. The strength of this program is a result of the dedication and skills of the researchers.

With a lifetime of commitment to shade tree research and production, the director has the ability to make sound judgments about the merits and marketability of a selection. His numerous contacts in the nursery industry, as well as the scientific community have helped him gain recognition in the field, thus providing credibility for his introductions. In addition the program has developed original and creative promotional materials, including individual logos for each plant.

Although research on shade trees for this program has been ongoing since the 1940s, Discov-Tree Program is new and has a few problems. One is the difficulty getting data back from the cooperators. The development of a standardized evaluation form should help improve the situation.

A second problem is the confusion surrounding plant names and the use of trademarks and patents. Following proper procedures in the future by registering plants with appropriate authorities and trademarking different names will resolve the problem. However, the plants that are incorrectly named will be difficult to sort out and correct.

A final problem stems from the fact that some shade

trees take a long time to develop a market niche. Fraxinus americana 'Autumn Applause' was released in 1975 and has just reached its full production 13 years later. The plant patent will expire in 4 years. Royalties will have to be collected from the trademark to recoup the costs of the many years of research that went into this selection.

1. *Staphylococcus aureus*

## CHAPTER 2

### SELECTED NOT-FOR-PROFIT WOODY PLANT INTRODUCTION PROGRAMS

Chapter 2 examines various types of not-for-profit plant introduction programs. As illustrated in figure 1, page 5, these programs have been categorized based upon common components.

The not-for-profit group are institutions which have been granted a tax-exempt status from the Internal Revenue Service. Funds generated from their plant introductions are returned to the program for operating expenses and no net profit is realized. The majority of these programs are funded by the federal, state or county government.

There are three categories of not-for-profit programs. First there is the plant breeding program. These programs were designed to promote plants developed through plant breeding. Features common to these programs include breeding, testing, cooperative evaluation, registration, and promotion. Plant introduction programs at the U.S. National Arboretum and Minnesota Landscape

Arboretum will be examined in this section.

The second not-for-profit group is the plant selection program. Models in this section range from sophisticated formalized programs to simpler, less structured designs. A common element is clonal selection and testing. Six plant selection programs are illustrated: University of British Columbia Botanical Garden, Saratoga Horticultural Foundation, United States Department of Agriculture Soil Conservation Service, North Central Regional Plant Introduction Station, Brookside Gardens, and Texas Agricultural Experiment Station.

Plant advocate programs are the third group of not-for-profit programs. These are informal programs which can be adopted by virtually any institution with a strong plant advocate on staff. Major emphasis is placed on promotion of selected plants. Plant advocate programs at the Arnold Arboretum and North Carolina State University Arboretum are discussed.



### Plant Breeding Programs

If a plant is to make it from research into tomorrow's landscapes, the plant breeder must develop it, the nurserymen must produce it, and the public must accept it.

Donald Egolf

Numerous individuals and institutions throughout the United States and Canada are involved in plant breeding research to develop superior landscape woody plants. However, only a few have a structured program to promote their introductions. This paper focuses on two programs which incorporate breeding, testing, cooperative evaluation, registration and promotion in their models. The programs examined are the U.S. National Arboretum's Introduction Program for Improved Shrubs and Trees, and the Minnesota Landscape Arboretum's Breeding, Selection and Evaluation of Landscape Plants. Both programs work closely with the commercial nursery industry and have been successful in gaining consumer acceptance of their introductions.

Plant breeding research often requires a long-term commitment of resources. Careful planning needs to be done to ensure there is continuity in the program, regardless of changes in the organization's staff or resources. Incorporating these goals in the institution's mission statement is the best way to ensure that a plant breeding program will have long term commitment. For example the primary objec-

tive for the Minnesota Landscape Arboretum is to test, evaluate and introduce plants for use in Minnesota.

This work requires the expertise of a geneticist who is trained in plant breeding and genetics, as well as a support staff to assist with propagation and cultivation of the crosses. One woody plant introduction may require 5 to 20 years of research. Universities have traditionally supported work with plant breeding. However, in the last decade increased pressure has been placed on faculty to publish. Since woody plant breeding projects are long-term goals, many non-tenured faculty, in particular, are putting their energies into other areas, that result in earlier publication.

In a 1985 survey conducted by Brooks and Vest, it was shown that a total of 7.7 full time scientists were working on breeding and genetics of landscape trees and shrubs at public supported institutions in the U.S. Compare this figure with 15.19 full time scientists working on the research of a single genus, the Irish potato (Brooks and Vest 1985).

Since public gardens are already repositories for germplasm and the staff do not have some of the pressures of tenured faculty to publish, these institutions make

suitable sites for plant breeding work. As stated earlier it would be important to incorporate these goals in the institution's mission, to make sure resources are available over a long period of time. A public garden could focus on a specific genus and a full time researcher placed on staff to manage the program. The institution's public relations department could be utilized to develop promotional materials for the new introductions. Several programs, such as Texas Agricultural Experiment Station and Minnesota Landscape Arboretum have effectively used their public relations department for development of color brochures and press releases.

Although considerable breeding work involving herbaceous plants is carried on by wholesale nurseries, few commercial concerns can afford the long-term commitment to growing space, and the long developmental period necessary for breeding of woody plants.

Budgets for the two plant breeding programs examined in this paper are approximately \$150,000 to \$200,000 annually. It is difficult to get an accurate figure for these programs since overhead costs and some salaries are absorbed by the institution and not broken out for each program.

When selecting a plant group for breeding work several factors should be considered: 1) There must be a source of potential germplasm. 2) The plant group needs to have a major problem that could be improved through plant breeding, such as cold hardiness, disease or insect resistance. 3) Plant groups selected must have consumer appeal, such as showy flowers or good fall color. 4) And it must be economically feasible for the wholesale nurserymen to produce the plant. For example, much of Donald Egolf's recent work at the U.S. National Arboretum has concentrated on the genus Lagerstroemia. This group has serious problems with mildew and cold hardiness. With a good source of germplasm, Egolf has been able to produce disease resistant plants with improved cold hardiness and superior aesthetic qualities, such as showy bark, and floriferousness. These plants appeal to commercial nurserymen and landscape architects because they are highly marketable, attractive, functional and can be produced in large quantities.

Plant breeding takes time. After a successful cross is made it may be seven years before a seedling is a suitable size for testing. Therefore it is most efficient to work on several genera at one time, for each may mature in a different year. In an effective plant breeding program 3 to 4 genera are worked annually, which allows a plant breeder to maximize work by creating a balanced program.

**U.S. National Arboretum**

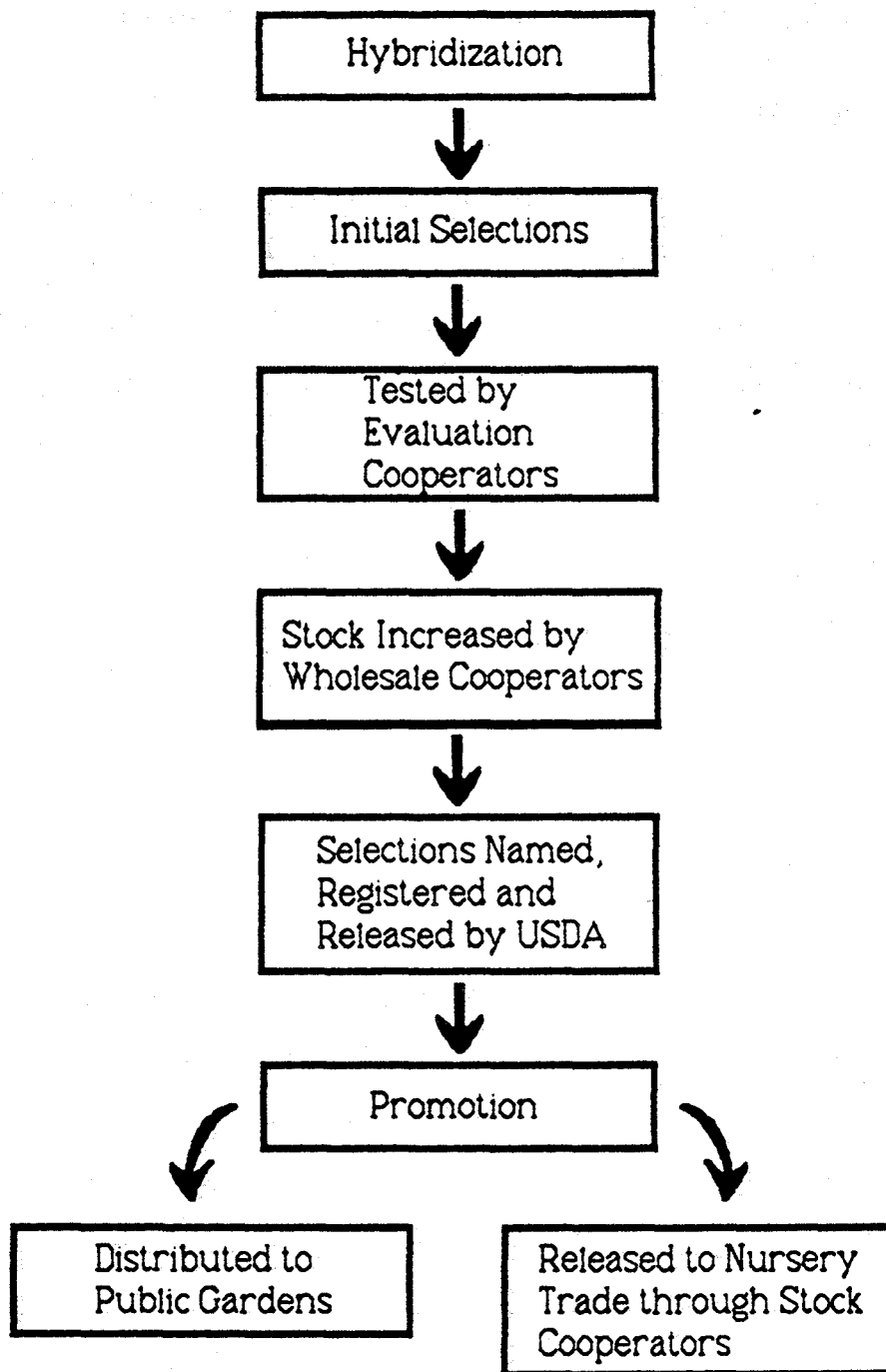
**Introduction Program for Improved Shrubs and Trees**

**Introduction**

The U.S. National Arboretum in Washington, D.C., was established in 1927 by Congress and is a part of the United States Department of Agriculture, Agricultural Research Service. The Arboretum is 444 acres and has extensive collections of woody and herbaceous plants. The National Bonsai Collection, Gotelli Dwarf Conifer Collection and National Herb Garden are a few of the major collections. In addition, there is an extensive herbarium of botanical specimens. The Arboretum's mission is to conduct research on trees, shrubs and herbaceous plants and educate the public. Currently the staff at the National Arboretum is 75.

The National Arboretum has one of the oldest plant introduction programs in the country. Work on plant breeding of trees and shrubs began in 1959. A formal program to promote plant introductions was initiated in 1969 and later modified in 1971. The components of this program include breeding, testing, cooperative evaluation, registration and promotion as illustrated in figure 4.

## Plant Sources:



**Figure 4. U.S. National Arboretum Program Model**

In 33 years, 130 woody and herbaceous plants have been introduced through the program to the commercial trade (see appendices, page 184). Many have received world-wide recognition and are used extensively in American gardens.

### Purpose

The mission of the U.S. National Arboretum's program is to improve woody ornamental plants for a relatively wide range of the United States. Major emphases are placed on disease and insect resistance, cold hardiness and stress tolerance. Work is currently being done on the genera Acer, Albizia, Alnus, Betula, Camellia, Cornus, Fraxinus, Halesia, Ilex, Koelreuteria, Lagerstroemia, Liquidambar, Magnolia, Malus, Picea, Platanus, Prunus, Pyracantha, Salix, Syringa, Viburnum, Ulmus, and Zelkova.

### Resources

There are three full time geneticists in the research department. One researcher concentrates on shrubs and small trees that provide summer bloom or extend the bloom period. Another geneticist works with tree species and the third focuses on shade and street trees. In addition, there are five horticulturists who assist the geneticists in all aspects of the research, as well as seven laborers who provide support in the greenhouse and

field production. Costs for the program are estimated at \$150,000 annually, exclusive of salaries.

Facilities include 85 acres for testing at the Beltsville Research Center in Glenn Dale, Maryland and 80 acres in Delaware and Ohio for evaluation of Acer, Picea and Ulmus species. In addition, the research program has 3 greenhouses (8400 square feet), 1 propagation greenhouse (1100 square feet), 14 lath house beds (7600 square feet), 7 plastic greenhouses (15,615 square feet), cold frames (1728 square feet) and a container/seedling nursery (38,600 square feet). Laboratory facilities include two general laboratories and one cytology and one tissue culture laboratory.

### Testing

Plant testing begins with the selection of seedlings from native populations displaying potential merit as superior cultivars or selected from advanced generations in controlled crosses. Selections are propagated and planted out for further evaluation. Plants may be inoculated with diseases to determine resistance or evaluated for cold hardiness, improved aesthetic qualities or insect resistance. Seedling populations from these crosses are grown and further tested. Detailed data is



collected for 3-10 years before seedling selections are made for the cooperative evaluation. Field notes are kept on file in a standardized format (see appendices, page 189). Propagation and cultural techniques are also assessed. When final selections are made, rooted cuttings are distributed to cooperators.

### Cooperative Evaluation

Currently the program has approximately 100 cooperators including nurseries, botanic gardens, arboreta, universities and private individuals. Each cooperator evaluates different plants based on their geographic location. Generally evaluation sites represent the widest climatic range for the plant being tested.

The National Arboretum criteria for becoming a cooperator is highly selective. To qualify one must have a keen interest in the particular genus, a working knowledge of plants, similar plants to provide a basis for comparison, and adequate land to test materials.

When a potential cooperator shows interest in the Program, the Arboretum sends a description of the Program, legal agreement forms and reprints of articles on introductions made at the Arboretum. Invitation letters are

sent to cooperators in December, and plants are distributed January through March. Cooperators receive a list of available plants and select those best suited for their situation. Usually 3 to 5 plants per accession are distributed; each is evaluated individually. Once a year cooperators complete simple evaluation forms, rating plants on a 1 to 3 scale for survival, cold hardiness and disease resistance, (see appendices, page 190). Failure to return the evaluation forms twice results in exclusion from the Program. Currently there is a waiting list to become a cooperator.

All cooperators sign a Standard Form Memorandum of Understanding with the National Arboretum (see appendices, page 191). This legal agreement prohibits the propagation of any test plants until authorized by the Arboretum. In the event that the plant is not named, the cooperator agrees to destroy it.

Although cooperators provide important data on the selection's adaptation to a geographic range, it is not the Arboretum's intention to have cooperators make the final selection of cultivars. However, it is important for the plant to receive favorable acceptance. Cooperators who are sold on the merits of a plant can do more to promote the introduction than other forms of advertising (Egolf 1987a).

Most plants are tested by cooperators for two years. When a plant regularly receives favorable reports and a commercial nursery shows an interest in producing the plant, a stock of approximately 2,000 plants is propagated by the Arboretum. Plants are sent free of charge to wholesale propagation nurseries that sell liners; these nurseries are called Stock Increase Cooperators. The Arboretum has found that it is most productive to provide stock in large numbers to a few Stock Increase Cooperators who can produce plants quickly for other wholesalers and retailers.

#### Introduction Procedures

Once a plant has been selected for introduction, it takes two years for the Arboretum to release it. During this time Stock Increase Cooperators are producing large quantities for sale. Plants are registered with the proper authority, a written description is submitted for publication in HortScience, and herbarium specimens and photographs are taken. Following publication, press releases are sent to numerous trade journals. Most publicity is directed to the wholesale nursery industry; they in turn create a demand for the introduction at the retail level.

A second wave of promotion is scheduled two to three years after the initial release at the same time the plant first appears in the retail catalog outlets. The information office of the Department of Agriculture reworks some of the previous information and puts it through their news media channels. Plants are promoted on radio talk shows, television, and by newspapers. By that time other groups such as Garden Writers, and Agricultural Extension Service Specialists have written articles and promoted the new plant releases.

Since the National Arboretum is federally funded plant introductions have never been patented or trademarked.

### Conclusions

This program fulfills its mission to introduce improved woody plants for the United States landscape. Based upon conversations with researchers and cooperators at other institutions, the author feels that the success of the program can be attributed to several factors. First, it is highly respected throughout the world. It has strong support from the nursery industry, academia and the public garden sector. Of the 130 plant introductions made in the program, all have eventually reached the retail market.

Early introductions were initially slow to be accepted, but today with improved promotion, new plants reach the market faster.

Second, U.S. National Arboretum has earned a reputation for producing superior plants. Plant breeders in the department are highly respected for their expertise and leadership in the field. New introductions are readily accepted and sought after by the horticulture industry.

Third, support by the nursery industry in the United States has contributed to the program's success. Since nurserymen are influential evaluators, their enthusiasm for a plant introduction does more for promotion of the plant than advertising.

And fourth, through the careful selection of cooperators over a wide geographic range, every plant has received favorable responses in some part of the country. Various methods of promotion have been effective in creating interest and demand for these plants. Careful follow through on all aspects of the program has ensured the acceptance of each introduction.

## Minnesota Landscape Arboretum

### Breeding, Selection and Evaluation of Landscape Plants

#### Introduction

The Minnesota Landscape Arboretum was established in 1958 and is part of the University of Minnesota Department of Horticultural Science and Landscape Architecture. The Arboretum, located in Chanhassen, Minnesota is 675 acres. Generic collections include materials from around the world, as well as landscaped gardens. Although major emphasis is on woody plants, there is also an herb garden and perennial garden. Major support for the institution comes from the University of Minnesota, plus additional funds from membership dues and contributions. The full-time staff at the arboretum is 40.

In 10 years, 12 plants have been introduced through this program (see appendices, page 192). Breeding, testing, cooperative evaluation, registration, royalty collection through a not-for-profit collecting agency and promotion are the components of this program, as illustrated in figure 5. Plant improvement research on woody ornamentals has been a primary function of the arboretum from its beginning in 1958. Plant evaluation and breeding started in 1978, when additional resources were committed to the research effort.

### Plant Sources:

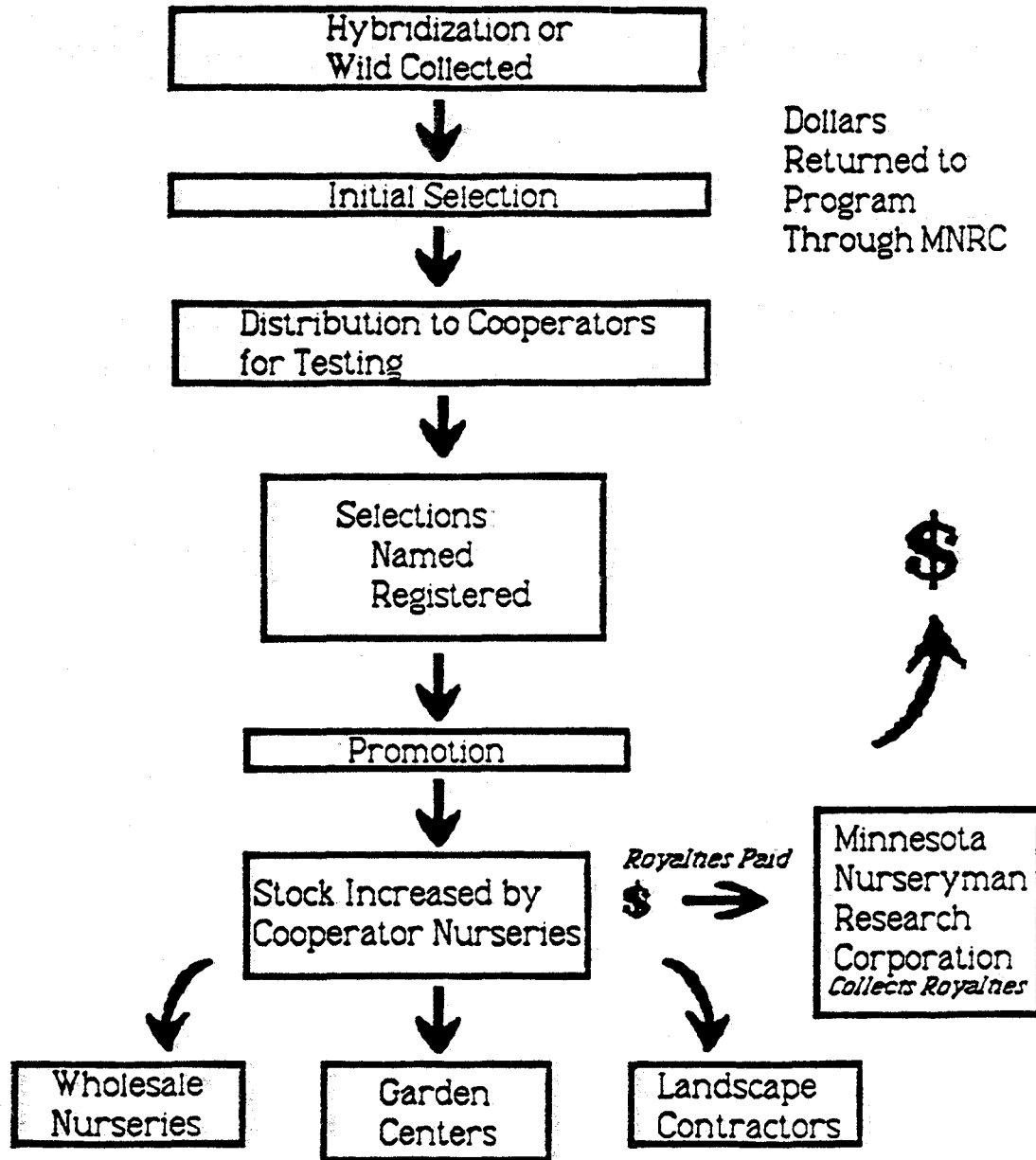


Figure 5. Minnesota Landscape Arboretum Program Model

Currently staff consists of four full time researchers working on plant breeding improvement, as well as related projects on plant propagation and cold hardiness. Annual costs for this program are approximately \$130,000.

### Purpose

The primary objective of the Minnesota Landscape Arboretum is to test, evaluate and introduce superior plants for landscape use in Minnesota. This plant testing program was a direct result of the institution's mission. As noted above, the Arboretum and plant improvement research began at the same time.

Major emphases in this program are placed on cold hardiness, insect/disease resistance, environmental stress tolerance and aesthetic qualities. Current research is on the genera Rhododendron, Viburnum, and Lonicera. Inter-generic crosses between Sorbus x Aronia are also studied.

Decisions regarding the focus of plant research are made in conjunction with the Minnesota Nurserymen's Association. A Plant Materials Committee acts as an advisory board to provide input on plants that they feel would be marketable. Plant breeding work is generally done in areas



where the best success and biggest contribution can be achieved with limited resources (Pellett 1987).

### Testing

Before plants are distributed to cooperators, initial plant selection may take 5 to 15 years, depending upon characteristics observed and growth rate. Data is collected internally on 20 different categories (see appendices, page 193) and entered in the field on a Radio Shack TRS-80 Model 100 hand held computer with 24K RAM. Information is downloaded to a microcomputer and used with dBase III software.

Results are compiled and available in the Arboretum Library. Since the document is used primarily for research it is difficult for the layperson to interpret. For example, the reader may believe that certain plants are cold hardy, when in fact they were covered by extensive snow. As a result the document has limited outside use.

### Cooperative Evaluation

The Minnesota Nurserymen's Association helped develop the cooperative testing program. Twenty five cooperators participate in the evaluation process. With the exception of two cooperators in Wisconsin and North Dakota,

the remainder are in Minnesota. Cooperators are nurseries, city foresters and university experiment stations.

Plants distributed for testing fit into one of two categories. Those developed through the program are restricted materials which cannot be propagated or distributed by cooperators until a final decision is made to introduce the plant. Cooperators receiving these materials sign a Propagation Agreement form which restricts distribution of plant introductions (see appendices, page 194). Although this form is not a legal agreement, it provides some control over the introduction of materials. Plants in the second category are those which are currently available in the trade and have no restrictions placed on them. They can be propagated by the cooperators and sold at any time.

Annually, cooperators are sent a descriptive list of 4 to 5 plants for testing. After making selections, they receive three plants of each accession. Once a year they fill out a simple evaluation form with seven categories, using a 1-5 rating (see appendices, page 195). Due to the simplicity of the form, the response rate has been good (Pellet 1987). This information is used internally to make decisions on plant merit and occasionally the cooperator's comments are used in articles for publication.

Minnesota Nurserymen Research Corporation

A unique feature of this program is its relationship to the Minnesota Nurserymen's Research Corporation (MNRC). This is a not-for-profit corporation developed with the specific goal of handling plant releases from the University of Minnesota. Since these introductions are not patented, MNRC functions to collect royalties on plant releases. Members of the corporation are primarily nurserymen, who have the opportunity to learn about new plant introductions before their competitors. Currently MNRC works with introductions of woody ornamentals, chrysanthemums and fruit.

MNRC acts primarily as a clearing house for the introductions. They set royalty fees and determine the length of the collection period. Initially royalties were collected for 5 years, then the period was extended to 10 years and today it is 17 years, the same as a plant patent. It is important to note that these plants are not patented. This is a gentlemen's agreement and cannot be legally enforced.

The University estimates that costs for one plant patent are \$2,000 to \$3,000. Since MNRC collects royalties and does the paper work for these introductions, this is a

great savings of time and money. All royalties collected through MNRC are returned to the plant testing program. In 1986 \$35,000 were collected on royalties. This money was used to support the research of two graduate students in woody ornamentals and fruit.

### Introduction Procedures

Introductions in the program are named, registered, and published in American Nurserymen. The release is usually made the summer before the plants reach the market. Timing is critical. When an introduction is announced sufficient stock must be available to meet the demand.

A glossy, one page release notice is produced for each plant by the University of Minnesota (see pocket material). These brochures are sent out through the University's public information service to the general public. Plant introductions are also promoted through the Cooperative Extension Service, where specialists give talks to the general public and garden groups.

For the most part it is the nurserymen's responsibility to create demand for these introductions. Currently enough information is going out on these plants that the demand greatly exceeds the supply.

### Conclusions

Although the Minnesota Landscape Arboretum Program is relatively new, it has fulfilled its goal to introduce superior plants for landscape use in Minnesota and other northern areas. Following conversations with the program coordinator and cooperators, the author feels this program has been successful for several reasons. First, it has the full support of the nursery industry in Minnesota and the U.S. Through its cooperative efforts with Minnesota Nurserymen's Association and Minnesota Nurserymen's Research Corporation (MNRC) a strong sense of commitment, involvement and excitement has been created. Second, the program has gained a reputation for introducing superior plants which meet a market need. Demand for these plants has greatly exceeded the supply. Third, the program has an effective system for collecting royalties and generating funds through the MNRC. Even though the Corporation cannot legally enforce the royalty structure, it has provided good control of introductions and most nurserymen pay the royalties. The funds generated help ensure the perpetuity of the program. Fourth and last, but perhaps most important, the program has excellent leadership. The current coordinator of the program is highly respected in his field and has been successful in making Minnesota a leader in northern plant introductions.

### Plant Selection Programs

Plant selection programs are a diverse group with common components of clonal selection and testing. Some programs have additional elements of cooperative evaluation, registration, royalties, trademarks and promotion. Plant selection programs examined in this section represent a broad range of models, starting with the most complex and working through to the simplest. Programs featured are University of British Columbia Botanical Garden, Saratoga Horticultural Foundation, USDA Agricultural Research Service and Soil Conservation Service, North Central Regional Introduction Station, Brookside Gardens, and Texas Agricultural Experiment Station.

Due to the diversity of the programs featured, it is difficult to generalize on resources needed for a Plant Selection Program. Staffing may range from one individual coordinating the entire program, as exemplified by Texas Agricultural Experiment Station, up to a full evaluation committee of 40, as seen at University of British Columbia Botanical Garden. Annual budget range is equally broad from \$15,000 to \$700,000.

University of British Columbia Botanical Garden  
Plant Introduction Scheme of the Botanical Garden

Introduction

The Plant Introduction Scheme of the Botanical Garden (PISBG) is a cooperative program designed as a joint venture between University of British Columbia, British Columbia Nursery Trades Association (BCNTA) and British Columbia Society of Landscape Architects (BCSLA). PISBG is coordinated by University of British Columbia Botanical Garden (UBC) in Vancouver, Canada. Established in 1916, the Botanical Garden is part of the University's Department of Agricultural Sciences. Over the past two decades, 60 acres of garden have been developed on campus, including a Native Plant Garden, Alpine Garden, Physic Garden, Food Garden, Japanese Garden and 30 acre Asian Garden.

Program components include clonal selection, testing, cooperative evaluation, registration, royalty collection through a not-for-profit collecting agency and promotion as illustrated in figure 6. PISBG took a year to design; plant testing and selection began in 1982 and first introductions were made in 1985. Nine plants have been released from the program in four years (see appendices, page 196).

## Plant Sources:

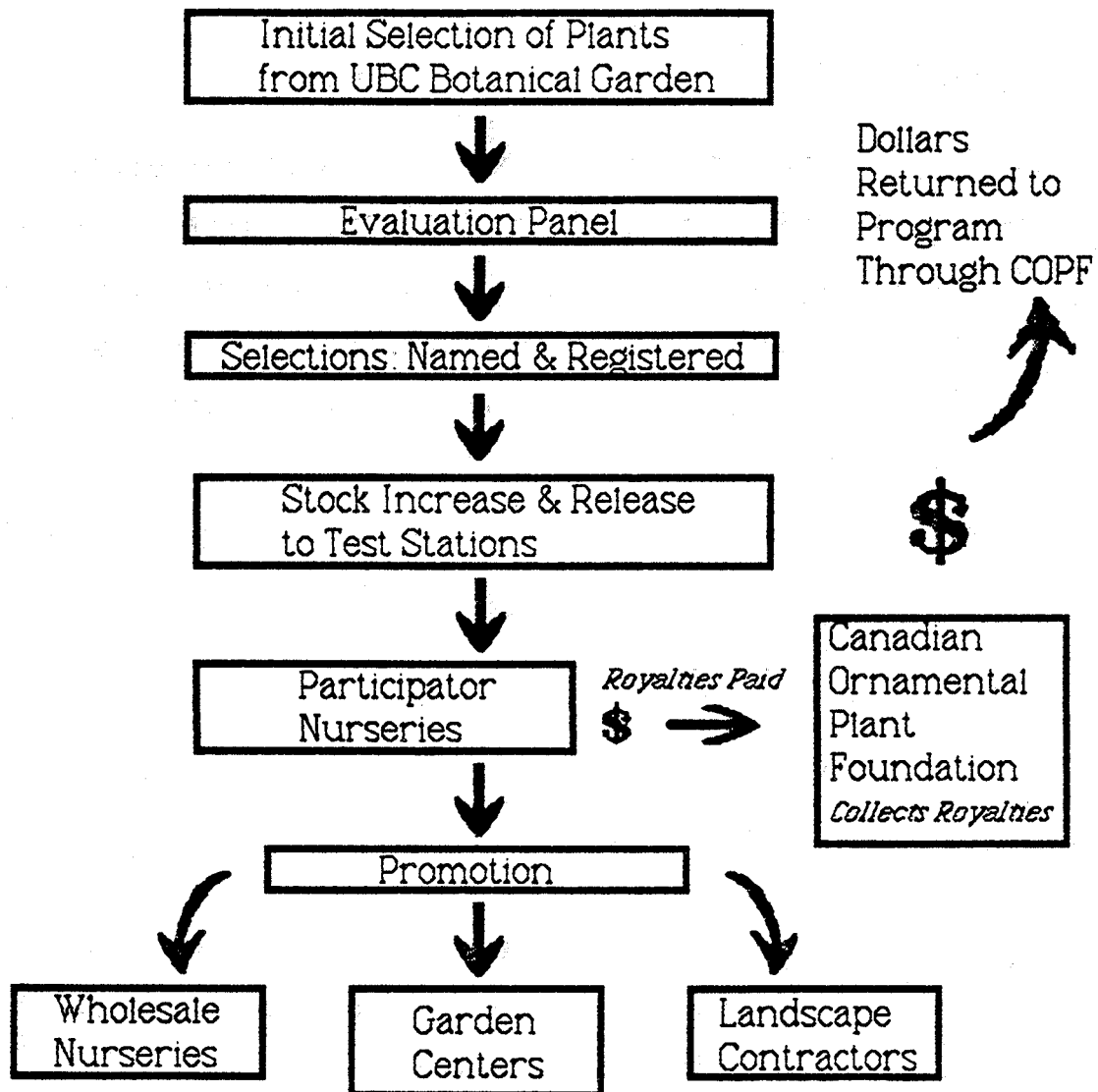


Figure 6. University of British Columbia Botanical Garden  
Program Model



There were two major reasons for the development of this program. In 1980 the British Columbia nursery industry was expanding and many plants were imported from the United States and Europe. British Columbia nursery industry wanted to develop its own high profile introductions which would reduce imports and initiate export opportunities. At the same time UBC was looking for ways to improve their public image and show taxpayers their work. Since the needs of both parties were high, everyone was willing to contribute to make the Program a success (Macdonald 1987a).

#### Resources

Paid staff in this program includes 50% of the director's time, a full time technician and gardener. In addition, numerous staff contribute small percentages of time. Facilities include a propagation greenhouse, shade house, polyethylene covered house, 1 1/2 acre test site, and 1 acre for commercial production.

Funding the first year of PISBG was \$140,000 Canadian, which included construction costs for a production facility. The annual budget has tapered off to approximately \$100,000 a year, for a portion of salaries, and all supplies and promotion. The Devonian Group of Charitable Foundations in Calgary and the Science Council

of British Columbia provided funding for the first five years. Each organization contributed \$70,000 per year for the first three years and an additional \$50,000 annually for two more years; five years of funding ended in September 1987.

It was the original intention of PISBG to collect enough royalties from introductions to become self sufficient within five years. Due to unforeseen difficulties collecting royalties from nurseries outside of British Columbia, it has been necessary to find other sources of funding. Currently PISBG is raising money to establish the Henry M. Eddie Plant Development Foundation. This endowment, plus the income from royalties and the sale of mother plants will provide the program with long-term capital. Members of the horticulture trade, allied fields and corporate sponsors are providing funds.

### Purpose

The primary purpose of PISBG is to introduce new and lesser-known plants into the nursery trade. Five principle objectives have been identified by the Executive Advisory Committee for the Program.

1. To use the collections of the UBC Botanical Garden as a resource to provide new material to the nursery industry that will in turn make available a greater variety of horticultural

plants for public use.

2. To use the Botanical Garden as a center for receiving new plants from North America and other international programs.

3. To encourage the use of new plants by landscape architects and local authorities.

4. To provide for the development of closer ties between the Botanical Garden, nursery trades, landscape architects, local authorities and contractors in the use and maintenance of new plants.

5. To provide for publication of research information on cultural and production procedures for new plant introductions (UBC Botanical Garden Brochure).

### Program Design

Before designing PISBG, other introduction programs were carefully studied to determine why they had not been successful. Three conclusions were reached: 1) too many plants were introduced at one time with no commitment from the nursery industry to utilize them, 2) nursery and landscape industries were not consulted about the initial selection of plants and 3) little publicity and follow up were used before and after the releases (Macdonald 1987a).

With these observations in mind, the garden staff at UBC, under the guidance of the director, met with representatives from BCNTA and BCSLA. These nurserymen, landscape architects and contractors formed the Executive Advisory Committee. Meeting monthly for one year, they

developed the program's objectives and created a sophisticated model. Today this main committee meets two or three times a year and advises and monitors the program.

Three subcommittees were formed in specialty areas. The Research & Development Subcommittee determines the best method of propagation, sets production schedules and solves cultural plant problems prior to release. Its members are from the Cooperative Extension Service, nursery industry and the Botanical Garden Director. A group of five wholesale nurserymen and the Botanical Garden director are on the Introduction & Release Subcommittee which makes final selections of plants for introduction. This group also sets and enforces the collection of royalties and decides when to make the release. The Publicity Subcommittee gives advice on local and national promotion for the program and the introductions (Macdonald 1987a).

### Testing

New plant selections are made from the 12,000 plant collection at UBC Botanical Garden. The Introduction & Release subcommittee selects 12 to 18 plants with introduction potential. A 30 member evaluation panel, consisting of representatives from wholesale and retail nurseries, landscape contractors and park board supervisors, meets

annually or biannually at the Botanical Garden to review the plants. The panel fills out a detailed questionnaire, evaluating plants for market potential, landscape use and ease of production (see appendices, page 197). The Introduction & Release subcommittee analyzes this information and selects plants for potential introduction.

PISBG recognizes two plant types. One is the new introduction which is given a registered cultivar name. Royalties are collected on these plants through the Canadian Ornamental Plant Foundation (COPF). The other type is the recommended plant, which PISBG does not feel is significantly different enough to merit a cultivar name, but is worth promoting. Recommended plants are given a number to identify the source of the clone and royalties are paid directly to PISBG, they do not go through COPF.

### Cooperative Evaluation

Once potential selections are made, UBC propagates and distributes plants to cooperative stations for further testing. Cooperators are chosen by UBC and include research stations, botanic gardens, and Agriculture Canada Research Stations. There are seven sites in Canada and five in the United States. Test sites are important; they give nurserymen an opportunity to observe large specimens in

different growing conditions across North America.

Annually test sites receive five plants of each potential introduction selected by the program director for the site's hardiness zone. Cooperators sign a legal agreement with PISBG and fill out evaluation reports annually. Categories include; site information, planting, description of winter damage, description of plant, general culture, pest and disease information (see appendices page 198). The return rate has been good, perhaps due to careful follow up by the director, who tries to visit each site annually.

#### Participator Nurseries

The next phase is stock increase to insure that sufficient numbers of mother plants are available at the time of public release. UBC produces up to 1,000 stock plants which are sold in lots of 50, to 26 participator nurseries at \$6.50 per gallon. Participator nurseries are wholesalers who sign a contractual agreement with PISBG, agreeing to pay royalties and build up a specific number of stock plants by the release date (see appendices, page 202). Participator nurseries are hand picked by PISBG and gain a two year advantage over others in the industry. Follow up is an important part of this process. Once or twice a year the Botanical Garden director or designate

visits each participator nursery. Since plant introductions are periodically examined, high quality production is encouraged.

#### Canadian Ornamental Plant Foundation

The Canadian Ornamental Plant Foundation (COPF) is a not-for-profit organization engaged in "the orderly distribution and promotion of new and improved ornamental plants for the Canadian consumer" (COPF brochure). This royalty-collecting agency is an independent body that is self financing. Since Canada does not have a plant patent system, this is a way to collect royalties on new releases.

All participator nurseries are required to join COPF at a annual cost of \$50, and pay royalties. Royalty fees are set by the Introduction & Release subcommittee, based on the plant's size at retail sale. For example, a four cent royalty is collected on a 4" pot, 15 cent royalty on a 1 gallon can. COPF keeps 10% of the royalties with the remainder returned to PISBG. To date PISBG has obtained \$70,000 in royalties.

Since COPF is basically a gentlemen's agreement with a voluntary contribution basis it is hard to enforce. Nurseries that do not join, have no access to PISBG's

promotional materials and are not placed on authorized growers list. PISBG estimates that approximately 80% of the total royalties due from British Columbia are actually collected. It is even more difficult to collect royalties outside of Canada, only 20% have been received from nurseries in foreign countries.

To improve the royalty collection rate, PISBG plans to work with several U.S. nurseries to channel introductions through the U.S. patent system. A nursery joins COPF, trademarks or patents the PISBG plant through the U.S. Patent Office, licenses the name, collects royalties and send them to COPF, who returns them to PISBG. A percentage of the royalties are retained by the U.S. nursery.

#### Plant Introduction Procedures

Careful consideration is given to each introduction's name. PISBG has tried to select names which would sell regionally, such as 'Pacific Blue' and 'Vancouver Gold'. Once plants are named they are registered.

Six months prior to the release of a new introduction, a well thought out program of promotion is activated. Colorful information sheets are created for each plant, which detail its growth habit, culture and sales potential



(see pocket material). Production costs are 14-15 cents a piece, printed in lots of 5,000. Each participator nursery receives 100 free sheets and has the option to buy more at 17-25 cents each. Nurserymen indicate that they could not afford to produce similar brochures in small numbers for themselves (Sorenson 1987).

A colorful picture label, with the same photograph and logo as the information sheet, is also created for each release. Attached to all plants for retail sales, participator nurseries pay 6.5 to 9.5 cents a piece for labels and are required to use them on all PISBG introductions.

PISBG uses many channels to promote introductions. Press releases are sent to garden writers and staff at local radio and television. A popular weekly gardening show on Canadian Broadcasting Company, called The Western Gardener, is co-hosted by a staff member at UBC and features new introductions. PISBG actively participates in nursery trade shows across North America and has been a major feature of the trade exhibit of plants from British Columbia. Seminars are given to garden center staff, emphasizing selling features of the introductions with recommendations for specific uses in the home garden. Horticultural information is available at UBC Botanical Garden, where people see the plants and ask questions.

New plant introductions are used on high profile public landscaping projects. Plants were sited at Expo '86, the World's Fair in Vancouver and around stations on the rapid transit Skytrain. These mass plantings allow the public to see the new introductions in a landscape setting.

This promotional program has generated excitement and interest for each introduction. Demand has greatly exceeded supply with some introductions such as Arctostaphylos 'Vancouver Jade'.

#### Program Impact on the British Columbia Nursery Industry

Although this program is merely seven years old and has made only nine plant introductions, the repercussions are far reaching. Through its extensive promotional activities PISBG has become well known throughout most of the North America. An export market has been created with the United States, Western Europe and New Zealand. PISBG has stimulated the development of several other similar introduction programs including; Royal Botanical Gardens, Hamilton, Ontario, Chicago Botanical Garden, Glencoe, Illinois and the North of Scotland Agricultural College, Aberdeen, Scotland (Macdonald 1987b).

Economic implications of PISBG for the Canadian

Nursery Industry were recently examined. An independent consultant, hired by the Science Council of British Columbia, conducted an economic analysis of the Program in 1987. It was learned that out of 212 programs funded by the council PISBG was in the top 9 of direct economic benefit to the industry. Sales of plants introduced through the program in 1985 were just under \$600,000 Canadian. Estimates for 1986 are for sales of 1.2 million and in 1987 1.9 million. To date participator nurseries have produced more than 1.5 million plants (Macdonald 1987a).

In addition to direct sales, participator nurseries indicate these introductions act as leaders and attract new customers. Clients seek out nurseries selling PISBG introductions and purchase other plants as well. As one participator nurseryman put it, "New plants are perfect for increasing your market share, because everyone wants to have new and different plants. Garden Centers will order from you and purchase other plants too" (Sorenson 1987).

### Conclusions

Since the inception of the program, PISBG has had several problems which have been dealt with effectively. First, the difficulty collecting royalties, due to the absence of a federal plant patent system has resulted in a

lack of funding as described previously. This situation should be resolved when the Endowment Foundation is established. A second problem has been an increasing difficulty locating superior plants for introduction. Once collections at UBC are evaluated, new sources of plants will be necessary. PISBG has started a plant breeding program to ensure superior plants for future introductions. And third, not every plant introduction has been widely sold. For example Rubus calycinoides 'Emerald Carpet' has had limited appeal because it is primarily a functional plant, rather than an aesthetic plant and cannot be exported to the U.S. due to quarantine restrictions.

In spite of these problems, it is the author's opinion that PISBG has been highly successful. First, the program has bridged the gap between UBC, the nursery trade, landscape architects, local authorities and contractors in British Columbia. Each industry has representation and actively participates, providing input on plant selections. PISBG provides promotional materials, plants are grown by participator nurseries, and landscape architects recommend and use the introductions. Industry involvement has been one of the keys to success in this program.

Second, PISBG has been careful to select plants that have wide market appeal, to introduce no more than 2-3

per year and to follow-up before and after the release with publicity. With a small number of introductions it is easier to create interest, enthusiasm and demand.

Third, strong leadership has made the program a success. Under the early guidance of Dr. Roy Taylor, now Director of Chicago Botanical Garden, and current Director, Bruce Macdonald, the program has excelled. Utilizing international as well as national contacts, both individuals fostered an open, trusting relationship with the industry and followed up on every aspect of the program.

Fourth, one of the initial goals, to make available a greater variety of horticultural plants for public use has been fulfilled. The economic figures cited above, support this statement and show overall sales of these introductions have been high.

Finally PISBG has created a sense of pride in all participants. Speaking with participator nurserymen, landscape architects and Botanical Garden staff I felt a strong commitment to this program. This type of relationship and cooperation is one that would benefit both public gardens and the horticulture industry world-wide.

## Saratoga Horticultural Foundation

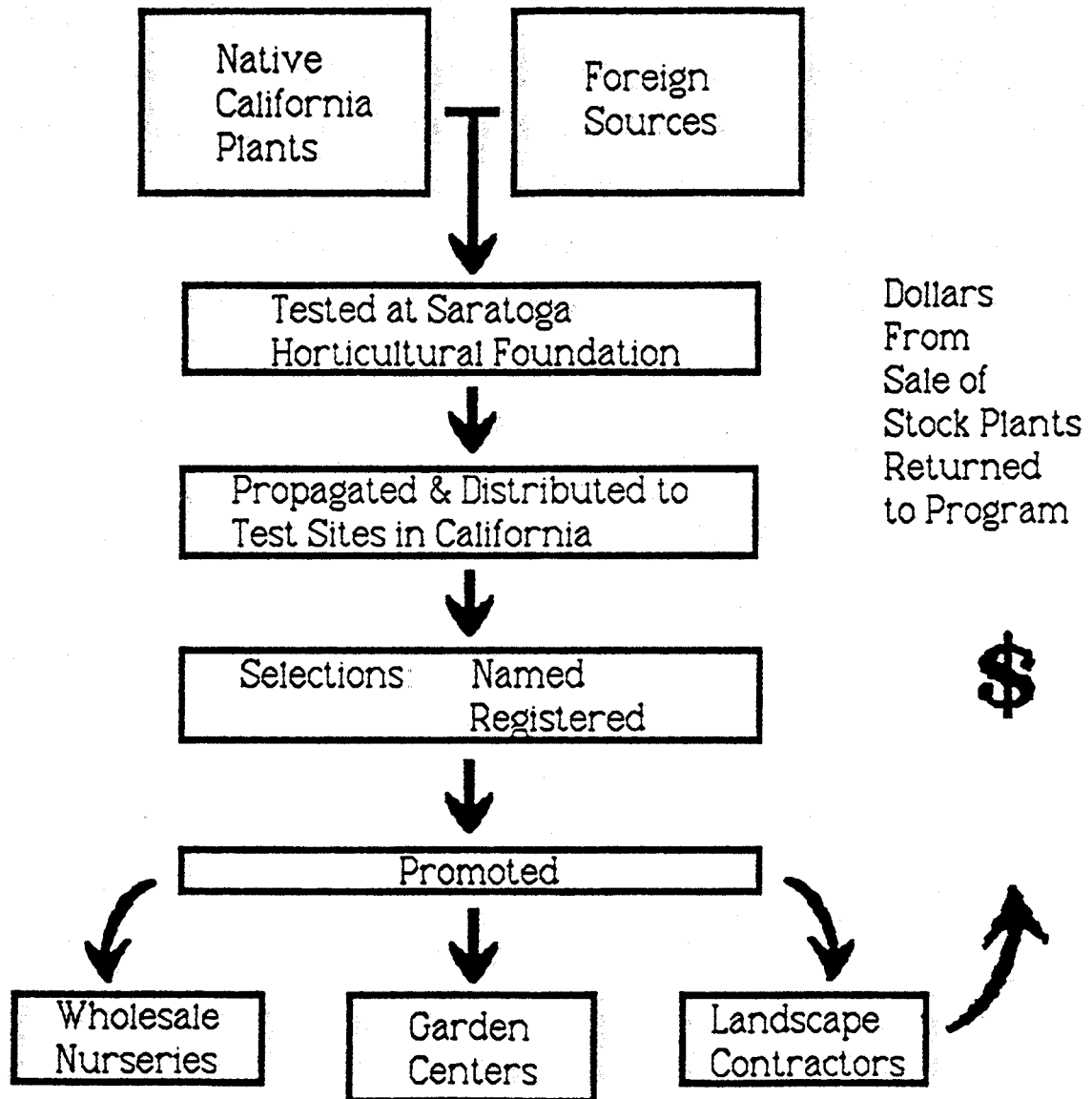
### Introduction

Saratoga Horticultural Foundation (SHF) located in San Martin, California was established in 1952 as an independent, not-for-profit organization. The Foundation was organized by a local California nurseryman who felt there was a need for an experimental garden to find new plants for the California landscape. This nurseryman, along with several other philanthropists, put up the initial funding and donated 6 acres of land in Saratoga for the Foundation. In 1985 the Foundation moved to its current four acre site in San Martin, California.

Saratoga Horticultural Foundation has introduced approximately 90 plants from more than 3,000 accessions, in 37 years, (see appendices, page 204). Program components include testing, registration and promotion as illustrated in figure 7.

When researching this topic in September 1987, major changes and restructuring were occurring at the Foundation. The former director had recently left and a search was on for his replacement. Past policies of plant patenting and royalty collection were being reviewed and plans for raising an endowment fund were discussed.

## Plant Sources:



**Figure 7. Saratoga Horticultural Foundation Program Model**

### Resources

Paid staff at SHF is 10; including a director who reports to a Board of Trustees, nursery manager, propagator, assistant propagator, field foreman, secretary and office manager. A large core of volunteers contribute time, money and expertise to the Foundation. In addition to the activities surrounding plant testing and introduction, staff conduct tours of the gardens, prepare a monthly newsletter and host an annual open house and plant sale.

Facilities at the San Martin location include a quarter acre of research plots, propagation greenhouse, liner house, shade cloth house and visitor center. An additional eight acre site was recently purchased six miles south of San Martin; four acres will be used for research with the remainder in commercial production.

The annual budget is \$700,000. Funding is from the sale of plant introductions (which basically covers production costs), fund raising, consulting and memberships.

### Purpose

Saratoga Horticultural Foundation's purpose is to introduce improved plants for the California landscape. Their mission statement includes seven goals:



1. Seek and obtain, or produce by hybridization, plant material likely to prove suitable for the current and future needs of gardening and landscaping in California with special reference to the requirements of 'appropriate horticulture'.
2. Establish, research, assess and evaluate the performance, suitability and usefulness of such material under California conditions.
3. Select as a result of this screening process superior, valuable or useful material for a continuing program of research and evaluation.
4. Research and determine satisfactory and workable techniques of propagation and production which will make such material amenable to commercial nursery production.
5. Introduce and promote that material which has emerged from this procedure and satisfies such criteria as may be determined.
6. Publicize and disseminate information, concerning these introductions, relevant to nurserymen, landscape industry, professional horticulturists, students and the public.
7. Provide a resource for advisory work, consultancy and education concerned with and relevant to these objectives (SHF mission Statement).

### Plant Sources

Decisions regarding selection of plants for testing have been made primarily by the director. Plants for testing at SHF come from climatic zones similar to California. Seeds and plants are received from numerous institutions in the U.S. and foreign countries. Saratoga Horticultural Foundation also sponsors plant collecting expeditions.

Three groups of plants are evaluated. The major thrust of the program is finding improved forms of native California plants. Examples include selections of Carpenteria californica, Fremonttoddendron, Garrya elliptica, and Ribes sanguineum var. glutinosum. Minimum testing is necessary for these plants, since their cultural requirements, for the most part, are already known. They can be introduced in a relatively short time.

The second group includes plants from foreign sources, which grow well in California, but are not widely known, such as Alphitonia excelsa from New Zealand, Corylus colurna from Turkey and Xanthoceras sorbifolium from Taiwan. Some of these plants have propagation and/or cultural problems which need to be solved before they are introduced.

A third group includes plants which have not been tested, but may be adaptable to the harsh summer climate of warmer areas of California. Examples include, Chinese species of Celtis, lesser known members of Phellodendron and male flowering forms of Fraxinus ornus. At the present time SHF does a limited amount of plant breeding with Cystisus and Agapanthus. Future plans include more emphasis on plant breeding (McMillan-Browse 1987b).

### Testing

Approximately 100 accessions are annually tested for adaptation to climate and soils, insect and disease resistance and improved ornamental features. The evaluation period varies with the plant; groundcovers and natives take a few years, whereas trees may require up to 20 years.

Field notes for each plant are recorded in a journal by the director. For promising plants 100-150 are propagated for distribution to various test sites throughout the state. Sites include nurseries, universities, arboreta, parks, and cities. Test sites are not formal cooperators; they do not fill out evaluation forms or sign any legal agreements with SHF. Staff from SHF visit these sites periodically to record their own evaluations on the plant's performance in that region of the country.

### Selection

Plants with superior performance are proposed as candidates for introduction. Further testing is conducted to decide whether they are marketable commodities. SHF determines methods to propagate the plant on a commercial scale and examines cultural problems that occur in the after care. If the plant continues to be difficult to grow or prone to diseases or other problems, SHF will not

produce it. However, for plants with superior qualities, such as Garrya elliptica, which is attractive and drought tolerant, SHF will continue to search for a better way to propagate it. Each year there may be 8-10 plants which are being researched for future introduction. Once cultural problems are solved, plant introductions are selected.

### Plant Introduction Procedures

Plants selected for introduction are propagated and stock increased so enough plants are on hand at the time of release. SHF tries to have 500-700 plants in 1 gallon cans and 300-500 in 5 gallons or larger.

Plant introductions are named and registered with the proper authorities. Plant names in the past were descriptive in nature, such as Ginkgo 'Autumn Gold'. In the future new plant names will include the word Saratoga. The Foundation believes this will bring greater recognition to the introductions from the program (Coe 1987).

In the past SHF patented, trademarked and collected royalties on their plant introductions. Over time the Foundation realized that the actual cost of patenting was never recouped from the moneys collected through royalties. They found it extremely difficult to enforce patents and

collect royalty fees. If a nurserymen did not pay them, the litigation process was costly, time consuming and could be potentially damaging to a not-for-profit's public image. Because royalty collection was so hard to enforce SHF thought the system had become unfair to those who paid the royalty. In addition, added costs for royalties might hinder the acceptance of these plants by commercial nurseries. As a result, the trustees of the Foundation have relinquished all existing patents and do not intend to patent any future introductions (McMillan-Browse 1987b).

#### Promotion

Promotion used for new introductions targets landscape architects and commercial nurserymen. Plant introductions are promoted through a variety of channels. A quarterly newsletter is sent to membership and approximately 3,000 landscape architects. Highlights of the letter include new introductions and current work at SHF. Introductions are also promoted at numerous professional meetings and in publications such as Sunset magazine. Once a year SHF has an open house to display the plants.

A portion of the Foundation's nursery manager's time is spent visiting nurseries throughout the state to sell and promote the plants. Fact sheets for each plant are

distributed and photographs of mature specimens and potted plants are shown to nursery people. Information on propagation and production techniques is also discussed. SHF has found that wholesalers are reluctant to try anything new. It takes from 3 to 6 years for one of the Foundation's plants to actually get into the market. During this period, plants are sold to the wholesale nurseries at a premium price. As plants gain in popularity, wholesalers purchase stock and produce the plant. When large quantities are available through wholesalers, their prices are comparatively lower than the Foundation. As SHF loses headway on the market, production at the Foundation is stopped since the nursery industry is reaching self-sufficiency.

The Foundation retains a stock block of each introduction. If the plant goes out of fashion or a large number are needed for a custom job, materials will still be available. For plants which are difficult to propagate, wholesalers prefer to buy liners from SHF, they never take on the full responsibility for producing the plant.

### Conclusions

It is difficult to fairly assess this program in light of the many changes that were occurring at the time of this research. With the hiring of a new director, the

Foundation may have a different approach and focus. The following comments are based upon the author's perceptions of the program in September of 1987.

The major goal of Saratoga Horticultural Foundation is to introduce new plants for the California landscape. This goal has been met as is evidenced by the fact that 90 introductions have been made in 37 years. Some of these introductions are widely grown by the nursery industry in California today.

A major problem of this program is gaining acceptance of introductions by the commercial industry. Superior plants, which are highly marketable, have been quickly embraced by the trade. An example is Arbutus 'Marina ', an attractive plant that is disease resistant and tolerant of a range of water and soil regimes. It has been more difficult to create a demand for serviceable plants such as Laurus 'Saratoga', a plant that is best suited for a hedge or screen (Coe 1987).

In the past, a stronger promotional program was used which included a color brochure for each introduction. Today typewritten fact sheets have replaced the showy brochures. Although the program is very strong in research, propagation and production, it is weak in promotion and

marketing. The bulk of the promotional work is done by the director and nursery manager, a job which could be filled by a full-time public relations person.

Since each introduction represents a considerable investment in time and money, it is important for every introduction to be accepted and further promoted by the trade. Because of the recent decision to relinquish all existing patents and trademarks, it is imperative that sales of stock plants increase. When Saratoga Horticultural Foundation was founded, funds for the program were to be generated by the development of a commercial nursery and sale of stock plants. It has become extremely difficult to support the research efforts of the institution through the sale of stock plants. The board is considering raising an endowment fund to ensure future support for the program.

Despite these problems, SHF has many assets including a highly qualified staff to conduct research, a dedicated board and core of volunteers and excellent facilities. With new leadership and direction the Foundation should be able sort out past problems and develop a sound financial base.



## United States Department of Agriculture

United States Department of Agriculture (USDA) operates two programs at the USDA Beltsville Agricultural Research Center, in Beltsville, Maryland. These programs, the Agricultural Research Service (ARS) and the Soil Conservation Service (SCS) are involved directly and/or indirectly in plant introductions. Although only a small percentage of their work deals with woody plants, both are a valuable resource for others interested in plant introduction work.

The following section will briefly describe the purpose, activities and organization of these branches of the USDA. They are included to provide an overview of USDA's activities in plant introduction and to the aid the reader's comprehension of the NC-7 Ornamental Plant Trials Program, operated by the Agricultural Research Service.

### Agricultural Research Service

#### **Purpose**

One of the functions of ARS, which is of greatest concern to plant introduction programs, is the coordination of the National Plant Germplasm System (NPGS). The goals of NPGS are the acquisition, preservation, evaluation and distribution of U.S. germplasm resources.

This includes enhancement of plant germplasm; research on conservation of genetic diversity, monitoring genetic variability and information management.

In 1982, 400,000 accessions of germplasm were maintained by NPGS as seed or vegetatively propagated stock. Approximately 7,000 to 15,000 new accessions of germplasm are added to the system annually. This material is available without charge to any bona-fide scientist in the U.S., and is also exchanged with foreign countries.

### Structure

There are three components in the National Plant Germplasm System: Regional Introduction Stations, National Seed Storage and the Information Network System. Four State/Federal Regional Plant Introduction Stations are located at Geneva, New York (NE-9), Experiment, Georgia (S-9), Ames, Iowa (NE-7) and Pullman, Washington, (W-6). Each station is responsible for the maintenance and preservation of selected crops and works with two advisory committees. A Regional Technical Committee makes policy recommendations to the National Plant Germplasm Committee. A Crop Advisory Committee, with members representing the germplasm user community such as federal, state and private organizations, provides general and specific guidelines.

The Ames, Iowa , NC-7 Regional Ornamental Plant Trials Program is discussed in greater detail later in Chapter 2.

The second component of NPGS is the National Seed Storage Laboratory, located at Fort Collins, Colorado. This facility is the nation's only long-term seed storage. It is used as a base collection for the U.S. and serves as a reserve stock to prevent the loss of germplasm and erosion of genetic diversity. It includes basic plant introductions, recently released and obsolete varieties, open-pollinated genetic stock, and type specimens of varieties registered under the Plant Variety Act for future reference.

The third component of the NPGS is the Germplasm Resources Information Network (GRIN). This computerized system is being developed to provide information on the holdings in the plant germplasm system. Standard descriptors will be used to describe accessions; including adaptation to a range of landscape conditions and other attributes such as insect and disease resistance. Through the use of a modem, germplasm suppliers and users will be able to communicate and share information on germplasm characteristics, location and viability of materials.

## Soil Conservation Service

Established in 1938, the Soil Conservation Service (SCS) has released over 200 conservation plants, including 47 woody plants (see appendices, page 205). Presently 150 of the 200 introductions are being produced by seed growers and nurserymen. Program components include clonal selection, testing, cooperative evaluation and promotion as illustrated in figure 8.

### **Purpose**

The purpose of SCS is to find plants to solve conservation problems. Their goals are the following:

to assemble, test, and release plant materials for conservation use; determine techniques for their successful use; provide for their commercial increase; and promote the use of plant materials needed to meet the objectives and priorities of the National Conservation Program (USDA 1982).

There are 24 field Plant Materials Centers (PMC) in the U.S. working to address specific conservation problems. Each PMC has advisory committees. A technical committee meets once a year and identifies regional problems and potential solutions. Members include ARS, local nurserymen, and private industry. An administrative committee composed of SCS agency heads is responsible for long range plans and providing program oversights to ensure

# Plant Sources:

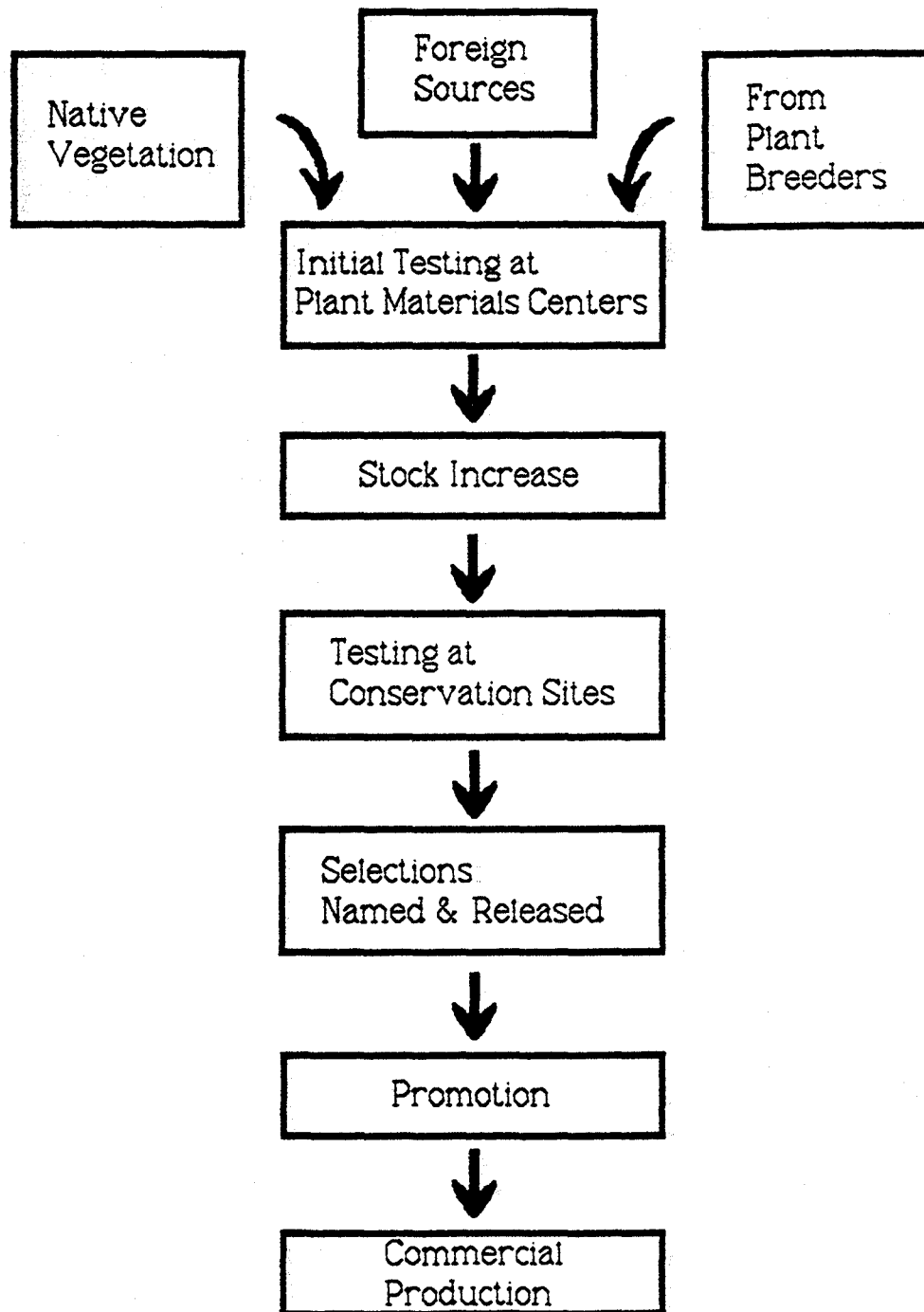


Figure 8. USDA Soil Conservation Service Program Model

consistency with overall agency goals. The National Plant Material Center provides overall support to the field centers in four areas: computers, introduction of foreign materials, technical studies, and as the principal contact for foreign researchers desiring information on plant material curated by SCS.

Serious conservation problems are identified and potential solutions recommended. If a problem can be potentially solved by a new plant, one or several of the Plant Materials Centers will address it, with the National PMC taking the lead if introduced plant needs are identified. Examples of conservation needs include erosion control, improved forage for livestock, and protection for farmsteads from wind and blowing soil.

Specialists at the Plant Materials Center conduct an extensive literature search to identify plants with the right characteristics to solve the problem. Researchers in the United States and foreign countries may provide additional help. Once plants with potential are identified, PMC acquires seed or plant material from other PMC, ARS, universities, botanic gardens and commercial outlets. Usually 50% of the accessions are from foreign sources.

Plants are propagated and seedlings grown in field plots at the National PMC. Plants are regularly observed and evaluated, and records are maintained on hardiness, vigor, disease and insect resistance and other performance characteristics. Plants with conservation potential are selected, seeds harvested, cleaned and distributed to PMC for thorough evaluation in field trials. Additional trial sites might include nurseries and private gardens.

Plants which are superior in field trials are approved for release. Cultivar names are selected and plants may be registered. Releases are made by SCS in cooperation with USDA Agricultural Research Service and State Experimental Stations. Plants are distributed to commercial seed producers, nurseries and local soil and water conservation districts. In general it takes 7 to 10 years for an accession to go from acquisition to release.

#### **Promotion of Plant Introductions**

Each Plant Materials Center is responsible for the promotion of their introduction in cooperation with local SCS county offices. Close ties are established with the commercial seed grower and nurserymen. Once or twice a year field days are held at the PMC. Periodic notes about promising plants are sent and a promotional brochure is

distributed for each introduction (see pocket material). Announcements and press releases are sent to professional journals. PMC tries to time the release so large numbers of plants are ready to send out when the announcement is made.

### Conclusions

Soil Conservation Service has an effective method of plant introduction which begins with the identification of a specific plant need. Access to germplasm through ARS and other foreign sources, provides large numbers of material for evaluation and selection. With its 24 field Plant Materials Centers, testing can occur over a wide geographic range. These introductions have received support from seed growers and nurserymen. In addition the program has fostered a good working relationship with foreign institutions through the exchange of plant materials.

Since introductions are selected to solve specific needs, a narrow focus in evaluating introductions has occasionally resulted in problems. For example, Rosa multiflora, a SCS introduction, is an aggressive plant which quickly became naturalized in the U.S. and is now considered a serious weed. Before making a release SCS needs to consider the consequences of introductions becoming naturalized.



## North Central Regional Plant Introduction Station

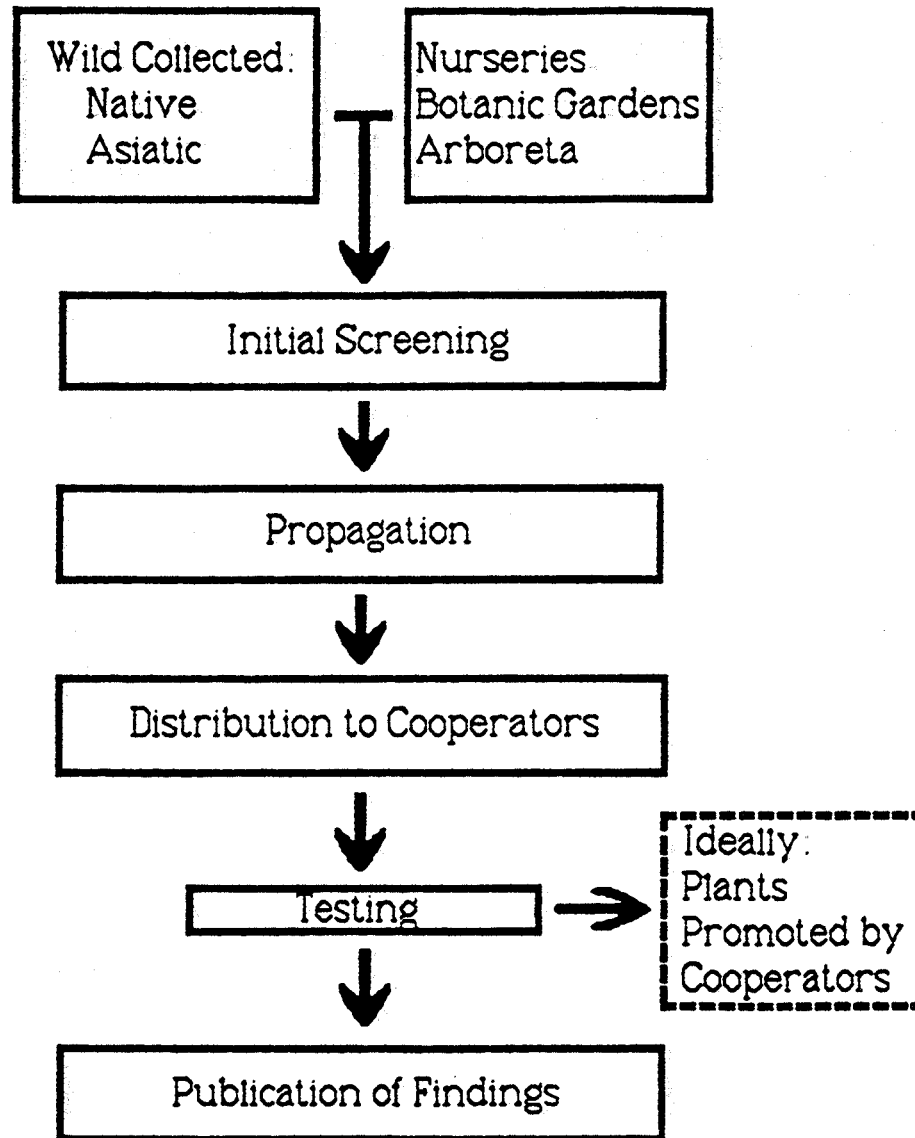
### NC-7 Regional Ornamental Plant Trials Program

#### Introduction

NC-7 Regional Ornamental Plant Trials Program is a small portion of the work conducted at the North Central Regional Plant Introduction Station (NCRPIS) in Ames, Iowa. NC-7 work comprises 4-5% of the total program. This station is one of four Regional Plant Introduction Stations in the United States, coordinated by the USDA Agricultural Research Station (ARS), as indicated in the previous section. NCRPIS is part of a nation-wide network to introduce and maintain plant germplasm, called the National Plant Germplasm System. Programs at NCRPIS are financially supported by ARS and Cooperative State Research Service of the USDA, the State Agricultural Experiment Stations of 12 north central states and Iowa State University.

NC-7 Program began in 1954 and has tested over 400 accessions. Components in this program include clonal selection, testing and cooperative evaluation as seen in figure 9. In 34 years of testing 3 plants have been introduced to the commercial trade as a direct result of this Program (see appendices, page 207). Other NC-7 plants have indirectly been introduced to the nursery industry through the program's cooperators.

## Plant Sources:



**Figure 9. NC-7 Regional Ornamental Plant Trials  
Program Model**

### Resources

One full-time horticulturist and two part-time students comprise the staff for the NC-7 Trial Program. The annual budget is \$47,000 which includes salaries, shipping costs and supplies. This figure does not include the program facilities which are covered by the NCRPIS budget.

Facilities for NC-7 include a greenhouse (1100 square feet), two shade houses (3600 square feet), a cold storage facility and laboratory for seed treatment and stratification, a cave for storage of dormant stock (440 square feet), and approximately 3 acres of field plots.

Decisions regarding the focus of the program, budget preparation, and collection and selection of plants for testing are made by an advisory group called the NC-7 Ornamental Subcommittee. Members on this committee include representatives from each Agricultural Experiment Station in the North Central Region.

### Purpose

The goal of the NC-7 Program is primarily to expand the range of useful landscape plants adapted to the Midwestern growing conditions. Objectives, as stated in a research project statement in October, 1985 are as follows:

- 1) To identify and locate new, untested, and unique landscape plants that have potential for expanding the range of useful plant materials for the North Central Region.
- 2) To coordinate a network of state, federal, and private not-for-profit cooperators in order to carry out long term field evaluations of these new plants over a broad range of environmental conditions with the joint objectives of giving new plants a thorough test throughout the region and of displaying plants with potential merit to horticulturists and the nursery industry.
- 3) To maintain by seed and vegetative propagation, collections of Plant introduction ornamental crop germplasm for use by the scientific community, as part of the working collections of the North Central Plant Introduction Station.
- 4) To work with appropriate crop advisory committees in the development of uniform descriptors for ornamental plants to be used in the Germplasm Resources Information Network (GRIN) and to utilize GRIN as a repository for data on the performance and characteristics of landscape plants and other ornamentals (Widrechner 1985b).

Major emphases are placed on cold hardiness, heat tolerance, disease and insect resistance, soil alkalinity tolerance and aesthetic qualities.

### Plant Sources

In the early 1980s plants selected for testing came primarily from collecting expeditions to northern Japan and China. Plants were wild collected from sites with extreme environmental conditions. Today emphasis is placed on key

on key populations of native species from the United States. Collections have been made in Colorado, Oklahoma and the Missouri River Valley (Widrlechner 1985a).

Additional plants for testing come from a variety of outside sources, including other evaluation programs, botanic gardens/arboreta and commercial nurseries. For example, Forsythia 'Meadowlark' was the result of a hybrid cross made at the Arnold Arboretum in 1936. In 1973 it came through the NC-7 program and was distributed to cooperators. As a result of positive data, it was introduced by two of the cooperators and propagated by commercial nurseries.

### Testing

Plant collections are propagated from seed and grown on for future distribution to trial sites. Some plants are initially screened for specific qualities, such as ornamental value, before distribution to cooperators, others are sent out with little or no testing. For example, if a parent plant shows tolerance to high pH, seedlings are sent, with no initial testing, to test sites with alkalinity problems. Field notes are handwritten and kept in a journal for internal use.

### Cooperative Evaluation

Currently NC-7 has 28 cooperators with 35 test sites in 18 states, concentrated primarily in the mid-west, with additional representation in New England and Alaska. Cooperators include Agricultural Experiment Stations, USDA Soil Conservation Service Stations, and arboreta/botanic gardens. To become an cooperator an institution must meet these criteria: be willing to make a 10 year commitment, have someone at the site who knows how to evaluate plants, and be located far enough away from other test sites so there is no duplication of effort.

Commercial nurseries are not cooperators in this program. NC-7 feels that giving them access to this broad range of plants could be an unfair advantage over other commercial nurseries. Also some test plants in this program have been developed or discovered by an individual or institution who would like to have the option, at a later date, to patent the new introduction. NC-7 fears that originators would be reluctant to have their plants tested in this program if there was fear of a commercial nursery getting the plant to market first (Widrlechner 1988).

Cooperators annually receive a list of NC-7 test plants and select those best suited for their site. Usually

3-4 plants per accession are sent out, unless a higher number is requested. When cooperators receive plants, they fill out a Report of Planting (see appendices, page 208). A Plot Information form is completed once accessions are planted in the field or landscape (see appendices, page 209). In addition, 1 year, 5 year and 10 year Performance Reports are completed by cooperators for each accession (see appendices, page 210).

NC-7 also provides an Accession Record Card which is for the cooperator's internal use only (see appendices, page 211). This form is intended to help cooperators organize information in these accessions for their own records. In some cases cooperators are asked to sign an agreement that would restrict their use of the test plants.

Cooperator's return rate of requested information has been approximately 70%; out of 230 reports sent out last year, 160 were returned. A follow up letter is sent to cooperators who have not returned reports. To further ensure a response the coordinator of NC-7 visits each test site biannually.

Information received from the cooperators is compiled in a Ten-Year Report on Regional Plantings. In the past this report was published through the NCRPIS and sent

to libraries and agricultural research facilities across the country. It did not have wide circulation. A new system is currently being designed through the Germplasm Resources Information Network (GRIN). This computerized system will allow access to this information through an international computer database.

### Plant Introduction Procedures

NC-7 is indirectly involved in plant introduction. The primary objective of the program is to test plants and publish findings; not to name, register, patent or promote new plants. Cooperators are encouraged to take on responsibility for making the release and promotion. NC-7 works closely with cooperators and helps facilitate the release of selections. As indicated previously, three plants have been introduced as a direct result of the NC-7 program. Ligustrum 'Cheyenne' was the only introduction made solely by NC-7 program. Dianthus 'Smokey' and Forsythia 'Meadowlark' were joint releases between cooperators and NC-7.

Since NC-7 is not directly involved in the introduction process, it is difficult to track their test plants. It is possible that numerous plants have gotten into the trade; superior forms of plants may be on the



market, with no distinction being made or credit given to NC-7. There is nothing to prevent a commercial nursery from naming and patenting one of the NC-7 clonal selections, as long as no restriction agreement form has been signed.

### Conclusions

The goals of the NC-7 program have been partially fulfilled. The program has identified and tested new landscape plants with potential in the North Central Region. In 33 years, 400 accessions have been tested, averaging 12 plants per year. A network of cooperators carry out long-term field evaluation in a broad range of environmental conditions.

Based upon conversations with the horticulturist at NC-7, the program has had several problems. One is the lack of appropriate control groups. Since a goal of the program is to identify superior clones, it is important for cooperators to compare NC-7 test plants with a control group of the same species. Generally this is not possible due to the unique nature of these plants. In addition, variations in test sites and cultural practices make it difficult to interpret data and draw valid conclusions (Widrlechner 1986).

A second problem stems from the lack of a coordinated policy on promotion. Cooperators are expected to take responsibility for introducing superior plants. This system has not worked very well; only three cultivars have been introduced to the trade as a direct result of this program. Superior plants need to have strong industry support and a promotional program to create interest and demand. The most successful introduction programs work closely with the nursery industry and develop a promotional strategy.

Despite these problems, the program is moving in a positive direction. In the early 1980s the program was without a director and information on the research was not being published. A new director, hired in 1983, has worked closely with the NC-7 Ornamental Subcommittee to make improvements in the program. His work has involved plant collecting, redesigning cooperator's evaluation forms to improve return rate, regular visits to cooperator's test sites, and extensive work to set up the Germplasm Resources Information Network. As GRIN comes on line, results from the program should have wider circulation in a standardized format that is easy to comprehend.

**Brookside Gardens**  
**Plant Evaluation Program**

**Introduction**

Brookside Gardens in Wheaton, Maryland is a 50-acre display garden developed and operated by the Maryland-National Capital Park and Planning Commission. The purposes of the institution are the display of common and unusual seasonal and permanent plants and education through public programs. A series of gardens includes two conservatories, Fragrance Garden, Rose Garden, Formal Garden and Japanese-style Landscape, Trial Gardens and a Azalea Garden. Brookside Gardens' full-time staff is 25.

Six plants have been formally introduced since 1982 (see appendices, page 212). Components of this program include clonal selection, cooperative evaluation, testing and registration, as illustrated in figure 10.

The plant evaluation program was initiated by Chief Horticulturist of the park system's Horticulture and Forestry Division. From 1976 to 1982 Brookside Gardens sponsored a series of plant collecting trips to Japan and Korea. The plant collector hired was an individual noted for his command of the language and expertise in cultivated and native plants of the Orient. The initial concept for

## Plant Sources:

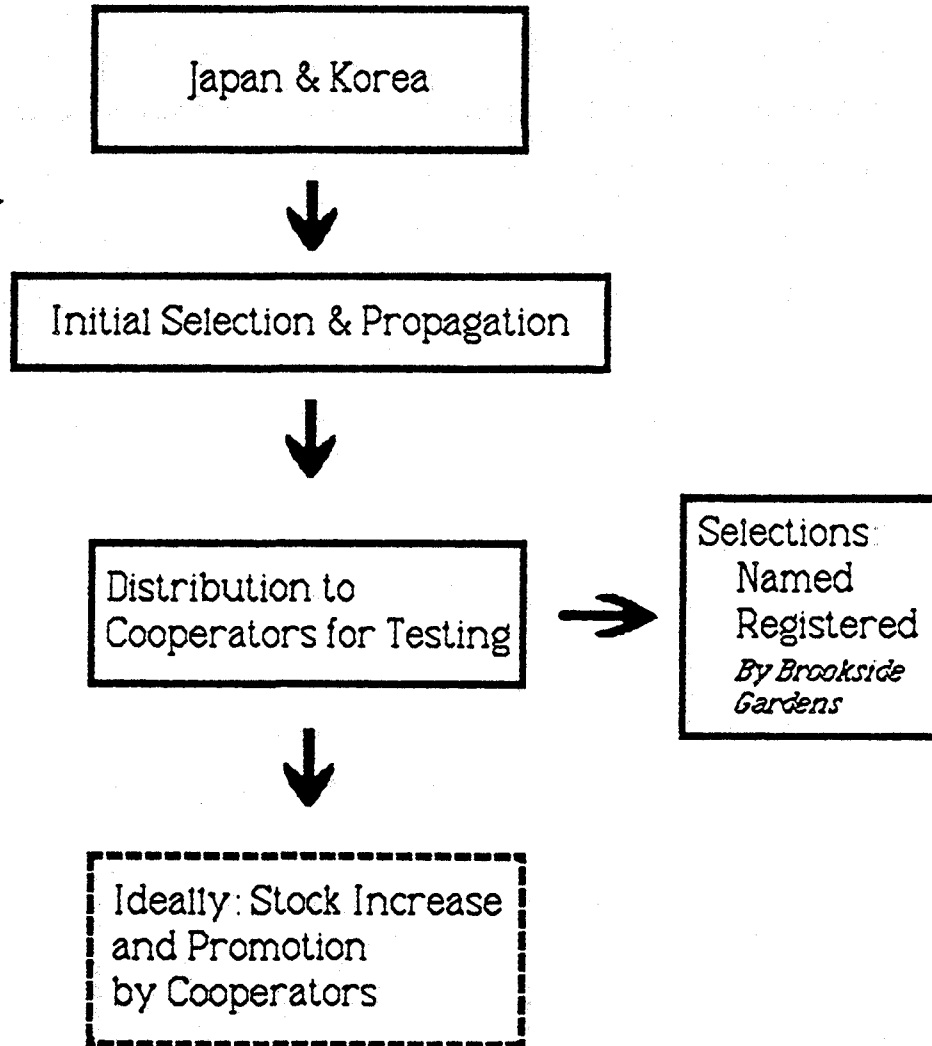


Figure 10. Brookside Gardens Program Model

this program was developed by the plant collector and further elaborated upon by the present curator.

During this period approximately 2,000 accessions were collected. Five hundred accessions were Satsuki azaleas which were tested at another garden site and distributed regionally. Early collections from 1976-1979 were made before Brookside Gardens had permanent staff or adequate facilities and were housed at the U.S. National Arboretum. Many accessions were lost and had to be "re-collected" on later expeditions. When collections were moved to Brookside Garden, 40% of the material perished before permanent staff was hired and adequate facilities created.

In 1979 Brookside Gardens hired a full-time curator, opened a new lath house and added more sunpit greenhouse facilities for this collection. Approximately 75 accessions were selected for evaluation. Plants were distributed annually to cooperators for evaluation from 1982 to 1987 with additional distributions planned for 1988 and 1989.

### Resources

Currently staff in the Evaluation Program consists of a curator and grower/propagator; each spend a portion of their time working with the program. The majority of decisions regarding the evaluations are made by the curator. The plant collector has had a consulting role at various times during the program's duration.

The curator estimates that individual plants cost \$5.00 per year to produce. With 3,000 plants maintained annually, for the evaluation program and park system, production costs are \$15,000. An additional \$200 is spent on shipping. Costs include materials, salaries and utilities.

### Purpose

This evaluation program has two goals as outlined by the curator:

- 1) to establish superior cultivars and species in the park system (i.e. to use rare and more interesting plants than what were available though U.S. nurseries when planting parks)
- 2) to formally and informally evaluate these plants at Brookside and at several selected sites throughout the country with the goal of introducing to the nursery trade those proven superior (Normandy 1986).

Brookside Gardens seeks to gain recognition for

plant introductions, but has no interest in financial arrangements, such as patents and trademarks.

Since Brookside Garden's primary purpose is display and education, the goals of this evaluation program can best be described as "tangential" to the overall institution's mission. The future of the program will be dependent upon the directions in which the garden and park system evolve. This evaluation program was intended to be a finite one, completed when all targeted plants from the specific collections were evaluated.

#### Plant Sources

General guidelines regarding the collection of plant materials from Japan and Korea were worked out by the collector and chief horticulturist. Final decisions on plant selection were made at the collection site. The focus of the collection was on Asiatic materials, particularly variegated plants and broadleaved evergreen species that might have cold hardiness potential in the mid-Atlantic region, plus groups of special interest to the collector and horticulturist. Plants were first collected in the wild and from public and private gardens. Later emphasis was on commercially available, clonal material.

The curator selected approximately 75 plants for testing in the Evaluation Program from the 2,000 Asiatic accessions. His decisions were based on the collector's descriptions, the perceived ornamental potential, cold hardiness and propagation rate. Selected plants were put in an outdoor trial nursery at Brookside Gardens to test for hardiness and compare with results reported by evaluators. Plants were propagated for distribution to cooperators.

### Cooperative Evaluation

Currently there are 11 cooperators at selected sites across the U.S. and one in Canada. These include botanic gardens, arboreta, and commercial nurseries. Cooperators were selected by the curator for their climatic location and demonstrated commitment to plant introduction. Although there were no legal agreements, one condition of participation was that cooperators not distribute, promote or sell plants without Brookside's permission. In return for the cooperator's time, they would have the first opportunity to propagate and promote these plants.

Annually cooperators received 1-3 plants of each accession selected by the curator for their particular climate. Institutions in mild climates might receive up to 75 different accessions. There was no set evaluation



period for each plant. Annually cooperators were requested to complete a two-page evaluation form for each accession. The forms included numerical ratings on cultural information and ornamental value (see appendices, page 213). Since some cooperators had 75 accessions the evaluation forms became a cumbersome task. The degree of response from cooperators varied considerably from highly responsive to no response at all. After three years of data collection the information was consolidated for each accession and handwritten notes were kept.

Originally Brookside intended to computerize this information and conduct statistical analysis. Later, it became apparent that the most important information was informal comments from cooperators, not the numerical ratings. Decisions regarding the merit of an accession were based upon reports from cooperators. If an accession was not an improvement, cooperators were encouraged to destroy the plant or use it internally.

#### Plant Introduction Procedures

All introductions have been registered, however, none were intended to be patented or trademarked. Brookside's evaluation program has no formal system for release and promotion of introductions. The responsibility

for introduction is placed on cooperators. Once they receive Brookside Garden's permission to promote the plant, they must build up stock and create a demand.

An example of an introduction that worked as anticipated by Brookside Gardens was Styrax japonicus 'Pink Chimes'. This plant was tested by cooperators and found to be identical in performance to the species, but had the ornamentally significant feature of pink flowers. It was increased by cooperators under contract to Wayside Gardens, who promoted and sold it to the retail market. Credit was given to Brookside Gardens.

### Conclusions

The plant evaluation program at Brookside Gardens is unique in that it was based upon the collection of a finite number of plants. The program has been operating for 5 years and will be winding down within the next two years. Virtually all the accessions for testing have been sent out and several plants have been released through wholesale nurseries.

In reviewing the goals of the Evaluation Program, it is the author's opinion that these goals have not yet been fully met. Although superior species and cultivars have been brought into the United States through this

evaluation program, the actual number of introductions so far is six. The degree to which they have been accepted by the nursery trade appears to be limited at this time.

Brookside Gardens encountered several problems which may have hindered the achievement of its goals. As indicated before, the original objectives for the program were not part of the overall mission of the institution. Today there is new leadership in the park system and emphasis is placed on regional work which will more directly benefit the taxpayers of the county. As a result this program will increasingly be sidelined as more attention is placed on the garden's primary mission and more demand is placed on the growing facilities towards that end.

A second problem may have stemmed from the fact that plant collecting began before permanent staff and adequate facilities were in place at Brookside Gardens. Many accessions were re-collected after perishing at the U.S. National Arboretum. Later large numbers died at Brookside Gardens, before staff were added and facilities improved. The program lacked leadership and structure in its infancy.

Other problems occurred because Brookside Gardens did not have tight control over its plant introductions. Since cooperators did not enter into a legal contractual agreement with Brookside, they were not required to get Brookside's approval before making an introduction, nor were they required to answer questionnaires. Some plants were distributed to other nurseries across the country by cooperators without Brookside's permission and one plant that was not endorsed by Brookside was inadvertently released. Other plants which did have Brookside's approval were released but credit was given to the plant collector for the introduction, instead of Brookside Gardens.

A final problem was the result of the lack of a promotional element in the evaluation program. Without a structured system, even the best introductions have a difficult time gaining acceptance on the market. Brookside was depending solely on the cooperators or interested wholesale nurseries to promote these introductions. This may work if the company is large and can make a substantial investment in promotion; such was the case with Wayside Gardens and Styrax 'Pink Chimes'. However smaller wholesalers do not always have the resources to develop this type of promotion. It may take years for a demand to be created for the plant; in the meantime the wholesaler may lose interest and stop producing the plant.

**Texas Agricultural Experiment Station**  
**Native Release Program**

**Introduction**

The Native Release Program of the Texas Agricultural Experiment Station is state funded and operates at Texas A & M University Research & Extension Center in Dallas, Texas. A research scientist is responsible for this small program, which has no cooperators and only one test site. As seen in figure 11, the program model includes the components of clonal selection of Texas natives, testing, registration, trademarks and promotion.

Begun in 1973, with the first introduction made in 1981, the program has introduced 9 plants into the Texas nursery trade (see appendices, page 215). Facilities include a propagation greenhouse, cool greenhouse for overwintering selections and 5 acres of test plots.

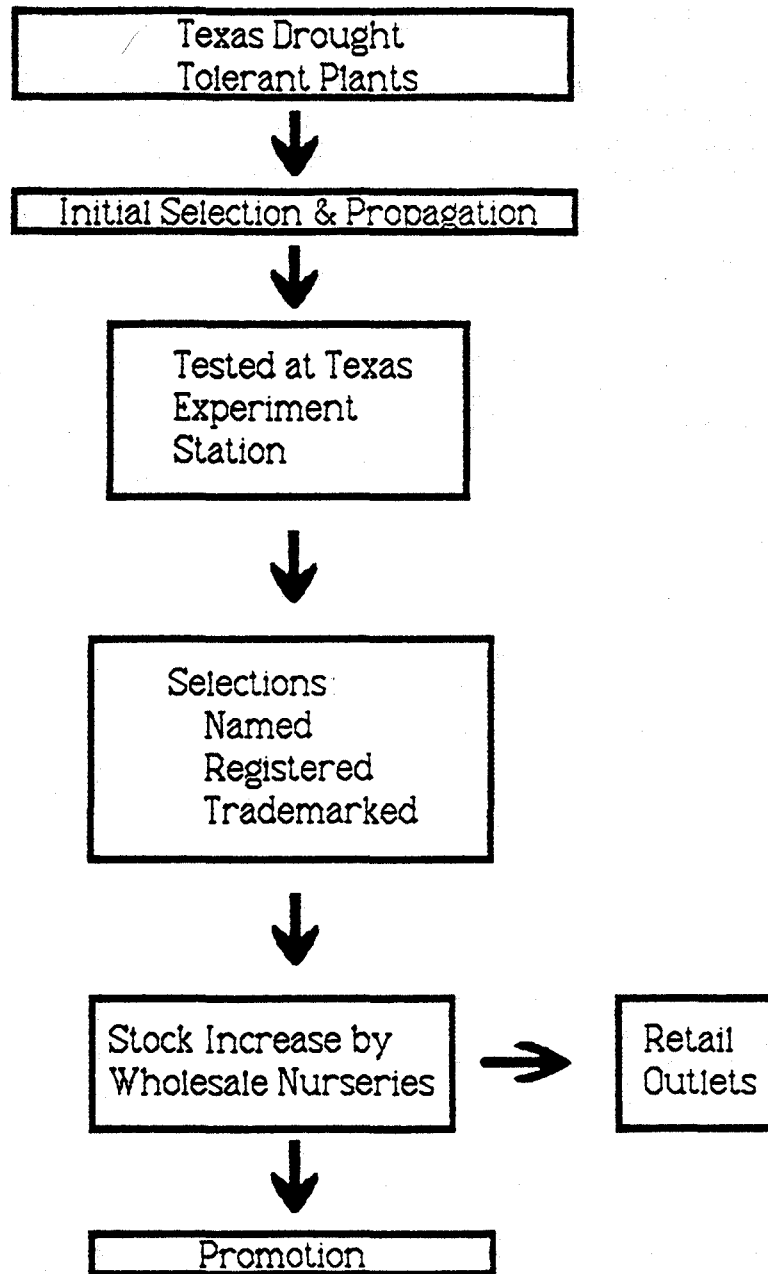
**Purpose**

The primary purpose of the program is to find native drought tolerant plants with aesthetic qualities for the Texas landscape. Native Release Program has four goals:

- 1) To make beautiful landscape plants available that do not require excess irrigation water or fossil energy, such as nitrogen, insecticides or fungicides.



### Plant Sources:



**Figure 11. Texas Agricultural Experiment Station  
Program Model**

- 2) To help the Texas nursery industry become less dependent on imported plants.
- 3) To make available more attractive native plants.
- 4) To help the Texas industry give its clients viable alternatives if they want attractive, low-maintenance and water and energy conserving plants (Simpson 1985).

### Plant Sources

The bulk of plant materials for testing come from western Texas. Major emphasis is placed on plants which will be water and energy conserving. Many of these plants have gray foliage with thick or fuzzy leaves. Not all forms collected are marketable, since many drought tolerant plants tend to be thorny.

### Testing

Native plants, which show potential, are tagged in the field, cuttings and/or seed are collected at the appropriate time and propagated for testing at the Experiment Station. The length of testing varies with the plant. For example plants which are observed for improved aesthetic qualities require a shorter test period than those observed for disease or insect resistance. No formal method of data collection is used. Until recently, all testing was done at one site. In 1988 cooperators were being selected statewide for the evaluation process.



Plants must meet several criteria before they are selected for introduction; including drought tolerance, ornamental value, ease of propagation, and low maintenance. Field testing is done to determine the plant's adaptability to local conditions; including soil pH of 7.5 to 8.0 and extreme temperatures ranging from 0 degrees to over 100 degrees Fahrenheit. Plant propagation methods and fertility tests are conducted to determine the best way to grow the plants in a container. Plants must be disease and insect resistant and have ornamental value in flowers, fruits, fall color or growth habit.

#### Introduction Procedures

Plants selected for introduction must be approved by the Foundation Seed Service, an organization of representatives from the Agricultural Experiment Station. Selections are named, registered, and published in HortScience. To date all cultivar names have been registered with the registrar for Unassigned Woody Ornamentals.

Plant names are trademarked in Texas and Arizona under the acronym TAM-REP, Texas A & M Resource Efficient Plants. Trademarking has helped the program gain recognition for its introductions. The trademark is also used by commercial nurserymen to further promote the plants.

Once plants are released, the Native Release Program invites wholesale nurseries to collect cuttings from the new introductions. In the past up to 10,000 cuttings have been taken for one introduction; all are free of charge. Each wholesaler signs a legal agreement with Texas Agricultural Experiment Station.

A colored brochure is produced for each introduction through the experiment station (see pocket material). Plants are further promoted at numerous plant society meetings and field days at the station. The best promotion has come through word of mouth, as Texas nurseries begin to produce these introductions.

### Conclusions

Although a small program, the Native Release Program has met its goal to find plants with aesthetic qualities that are drought tolerant in the Texas landscape. Nine plant introductions have been made since 1981.

According to the Program's Research Scientist, a major difficulty this program has had is gaining acceptance for these introductions from the Texas Nursery Industry. Traditionally Asiatic introductions, which are not drought tolerant, but are showier and easier to market have

received greater recognition. The program needs a stronger promotional element to generate more excitement for these introductions.

In addition the program has minimal control over its introductions. Without a plant patent, releases can be renamed and trademarked by any grower. The current TAM-REP trademark has helped identify these plants, but its use cannot be enforced. The Experiment Station would like the Native Release Program to raise some of their own funds and has encouraged them to patent introductions. Since the program is state funded, there is concern that nurserymen would be reluctant to pay royalties on these plants, since their tax dollars support the program. Royalty collection might further compound the problem of gaining acceptance by the nursery industry. An idea the Program is considering is to auction the rights to each introduction. The highest bidder would have the opportunity to patent the plant.

In spite of these problems, the Native Plant Release Program is fortunate to have a strong plant advocate coordinating the program. Benny Simpson, the research scientist who coordinates this work, believes in the goals of this project and has shown continued dedication and commitment.

### Plant Advocate Programs

Plant advocate programs are prevalent in arboreta, botanic gardens and universities today. Many institutions have plant advocates on staff, who promote specific plants or plant groups at every opportunity. Horticulturists, propagators, gardeners, researchers, and arborists are a few examples of individuals who emerge as advocates. These programs are generally informal, with a simple structure that includes clonal selection, testing and promotion. Minimal resources in terms of staff, facilities and funding are required. Two programs examined in this paper are the Arnold Arboretum of Harvard University in Jamaica Plain, Massachusetts and North Carolina State University Arboretum (NCSU) in Raleigh, North Carolina.

A key to success in these programs is a dedicated plant advocate. Each advocate should have extensive plant knowledge regarding the specific groups in study, numerous contacts in the horticulture field, an understanding of the needs of the commercial trade and skills in plant propagation and production. At NCSU one individual runs the program, with assistance from support staff. Four advocates work as a team at the Arnold Arboretum.

Budgets for the two programs examined in this paper are approximately \$20,000 each annually. Expenses include nursery supplies, postage for shipping plant materials and travel money for plant collecting, visiting other institutions, and giving talks at professional meetings. Since the plant advocate role is usually a small portion of the individual's overall job, budgets for these programs generally do not include salaries or overhead.

In order to give plants a fair test, adequate space is needed in a location where plants will receive some care and maintenance. Most plant advocate programs produce small plants, 2-3 years old, for distribution. This cuts down on the amount of growing space needed for production and allows for quick and inexpensive distribution.

Sources of plants for testing in these programs is unlimited. Generally plants are clonal selections, rather than products of breeding. Seed exchanges, materials from other institutions, native plant collecting trips or other introduction programs are some common sources. Plants may be new or rare, or older materials that failed to gain acceptance by the commercial trade due to lack of testing or problems with propagation and production.

## Arnold Arboretum of Harvard University

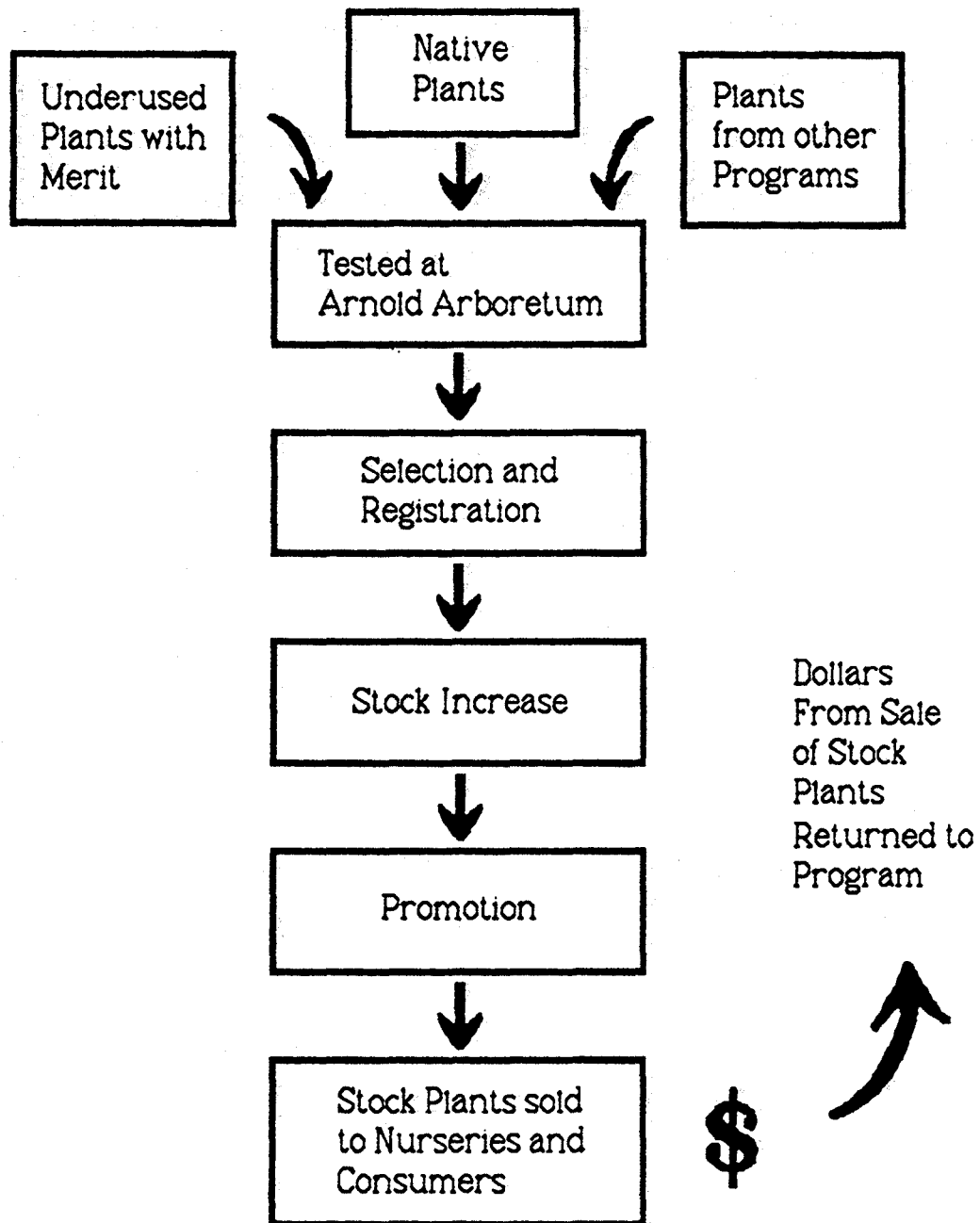
### Introduction

The Arnold Arboretum, located in Jamaica Plain, Massachusetts, is owned by the city of Boston, administered by Harvard University and supported by its own endowment and membership. This 265 acre Arboretum is the oldest in the United States, founded in 1872. It has extensive collections of 7,000 taxa of trees and shrubs and a large herbarium containing approximately 850,000 specimens. The primary mission of the Arnold Arboretum is:

to develop, curate and maintain a well-documented collection of living woody plants from around the world that are hardy in the Boston area (Arnold Arboretum 1988).

Nearly 2,000 new plants have been imported to this country by the Arnold Arboretum. Although many are interesting as botanical specimens, some are superior ornamentals. A program for introducing superior plants to the nursery industry and consumer has been developed. This program combines the components of clonal selection, testing, registration and promotion as seen in figure 12. For a partial list of the Arnold Arboretum's plant introductions see appendices, page 216.

**Plant Sources:**



**Figure 12. Arnold Arboretum Program Model**

### Purpose

The Arnold Arboretum's introduction program has three goals. One, to test, introduce and promote woody and herbaceous plants which have potential for northeastern United States. Two, to receive recognition or credit for new introductions and three, to generate enough funds to keep the program self-supporting (Koller 1988).

### Resources

Four plant advocates in the horticulture department work with plant introductions. Each one has an area of expertise and spends a small portion of their total time working in this area. The horticulturist is interested in plants which can adapt to difficult urban sites. Syringa and members of the Oleaceae are the focus of the plant propagator. The assistant plant propagator studies the genus Magnolia and dwarf conifers and an additional staff member works with Acer and endangered species. Their total time combined, working with plant introductions, is equivalent to approximately half time for one person (Koller 1988).

Facilities for this program include 300 square feet of greenhouse space and approximately one acre of test plots. Current budget is approximately \$20,000 annually,



including salaries. To recoup some of these expenses, the Arnold Arboretum annually has a rare plant auction, sells stock plants of new introductions and charges for services collecting cuttings and seeds for commercial nurserymen. Last year approximately \$20,000 were generated from these activities, enough to support the annual budget.

### Plant Sources

Plants for introduction and promotion come from a variety of sources in this program. Some plants have already been introduced in the United States, but never received much recognition, such as Neillia sinensis, collected by E.H. Wilson in 1907. Other plants are new to this country and recently introduced through one of the Asian plant collecting expeditions, such as Heptacodium jasiminoides, brought into this country in 1980 by the Sino-American Botanical Expedition. A third group are native plants collected by Arnold Arboretum staff. A final group includes plants from other institution's that never received thorough testing such Itea japonica 'Beppu,' an introduction from the U.S. National Arboretum.

### Testing

There are no cooperators in this program, the Arnold Arboretum has their own system for testing. Each

plant advocate makes initial decisions on materials to be observed. A minimum of six plants per accession are evaluated 5 to 10 years or longer and informal field notes are kept. Primary consideration is the plant's adaptation to the Boston area. Information on cold hardiness, size, flowers, fruits, autumn color and bark characteristics are noted. Propagation and production techniques are studied and determined; occasionally local nurserymen will provide assistance for promising plants. Information on each accession is computerized.

The Arboretum encourages other horticultural institutions in the U.S. to test plants which have shown promise in the Boston area. Seeds or rooted cuttings are distributed to numerous sites, however, no data is formally collected.

### Introduction Procedures

Once selections are made, the horticulture department develops a strategy to promote the plant for the next 1 to 5 years. Each advocate is responsible for a specific introduction; including registering new introductions, increasing stock, and writing articles for publication.

### Promotion

Promotion is a strong component in this program. Descriptive articles on introductions are published in the Arboretum's scientific journal, Arnoldia, in specialty journals such as Magnolia Bulletin and American Nurserymen. Articles indicate that selections are available through the Arnold Arboretum.

New introductions are also promoted at the Arboretum's annual rare plant auction and given away as special dividends to members. Numerous talks on selections are given at professional meetings, trade shows and nurserymen's associations in New England and across the country. Each advocate promotes all new introductions, in addition to other plants that are suited for that geographic region of the country. Annually, at the Eastern Regional Meeting of the International Plant Propagator's Society, the Arnold Arboretum coordinates and moderates the New Plants Forum and presents several of their selections.

When interest is generated for new introductions, stock plants are sold for a premium price. This practice was initiated several years ago. The Arboretum's recent introduction, Pinus nigra 'Arnold Sentinel', was sold at a fixed price for everyone; \$50 for a two year graft, or \$100

for three plants. Arnold Arboretum feels that once a plant is available through the commercial trade, nurserymen can produce plants faster and more widely distribute them, making their prices cheaper. In order to recover costs for testing and promotion the Arboretum must charge premium prices for stock plants. Despite high prices, stock plants for this introduction have already been depleted.

Nurserymen are charged for cuttings or seeds from the Arboretum's collections. Charges are \$20 per hour for collecting time, plus a fee for each cutting ranging from 25 cents to \$1.00. When this policy was initiated, the Arboretum thought extra costs would discourage nurserymen from requesting large quantities of plant materials. However, nurserymen indicate they prefer the new arrangement. As a result the actual number of requests has increased and the Arboretum is having difficulty filling all the orders, given their resources.

### Plant Patents

The only plant the Arboretum collects royalties on is Forsythia 'Meadowlark'. This cultivar was an open pollinated selection made by an early geneticist at the Arnold. It was tested through the NC-7 program in Ames, Iowa and later named and registered. An agreement was made

with the Growers Association of North Dakota and South Dakota whereby the Arnold Arboretum receives 20% of the royalties.

### Conclusions

The goals of this program are slowly being met. The first goal, to introduce plants with merit for the Boston area, has been reached. Many new introductions are now on the market as a direct or indirect result of the program. The Arnold Arboretum has been careful to target nurseries that are receptive to new introductions, such as Princeton and Weston nurseries. These relationships have been established over the years, as the Arnold Arboretum demonstrated ability to select superior plants.

The second goal, to receive recognition for these introductions, has been partially fulfilled. While numerous plants have been credited to the efforts of the Arnold Arboretum, many currently in the trade have not. In the past the Arboretum has kept a low profile and not been as vocal about their introductions as some other programs.

The third goal, generating enough funds to be self-supporting, has recently been addressed. In the past the Arnold Arboretum charged a minimal \$5 for each stock

plant and the collection of plant materials was free of charge. With increasing pressure to generate more funds, premium prices were placed on stock plants several years ago. The Arboretum's horticulturist feels that the institution is contributing to the nursery trade by having stock plants available. In turn the trade should be willing to fund the maintenance of these plants. This new arrangement has worked well for the Arboretum and the trade.

The success of this program can be attributed to several factors. One is the team approach. With four plant advocates working in their specialty areas each one has become recognized for their expertise in the field. Through the use of an extensive promotional campaign, information regarding the new introductions has reached the horticulture industry across the country. With the team approach, the program is not dependent upon one individual and the work load is shared. More plants can be tested and promotional activities broader based.

The second factor that will ensure the longevity of this work is the Arnold Arboretum's plan to generate funds for the program. Not-for-profit institutions need to recognize that a system is needed for recovering the costs of testing and promotion. The model provided by the Arnold Arboretum illustrates one method that has been effective.

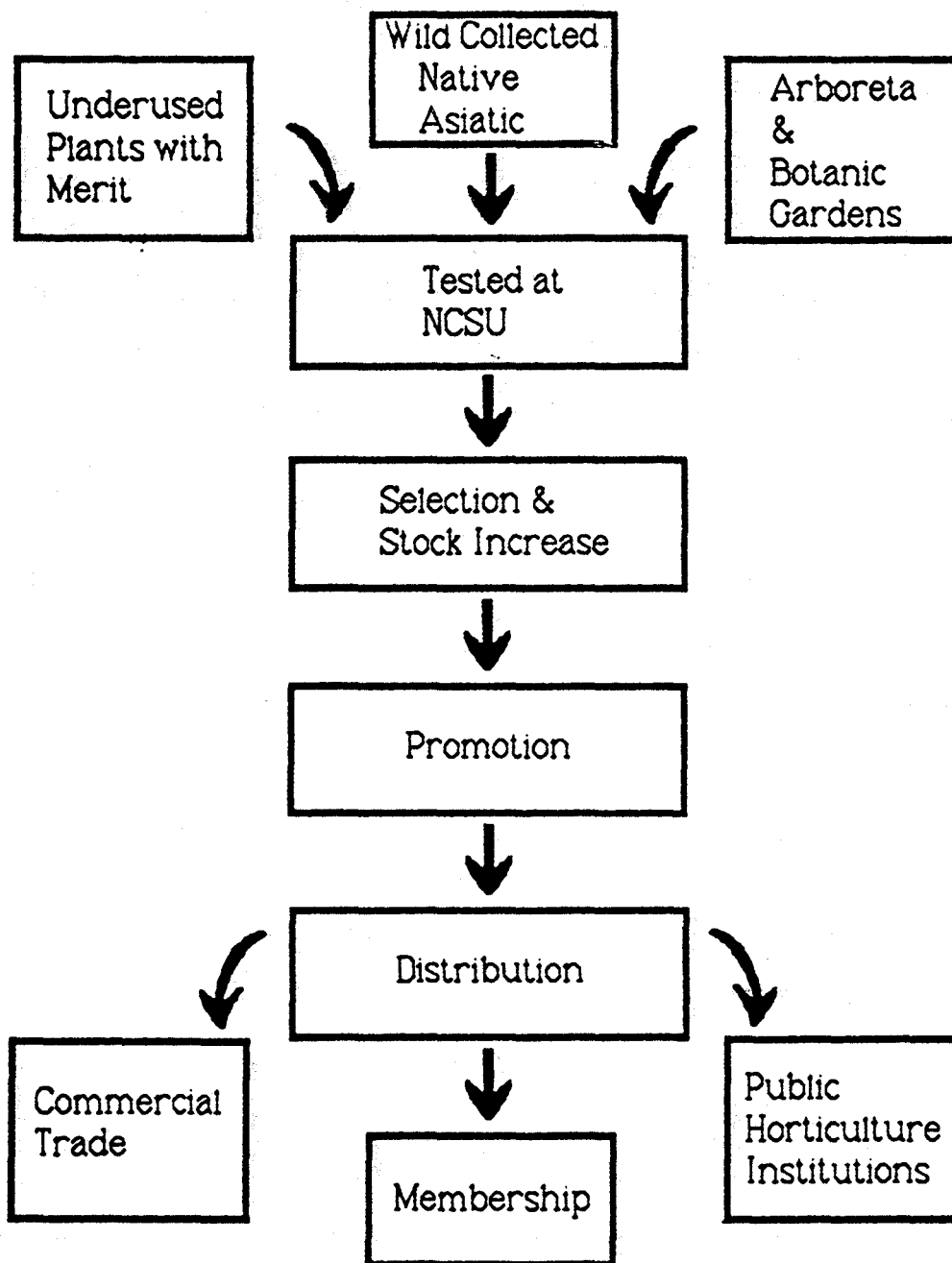
North Carolina State University Arboretum  
Program for the Introduction of Plants to the  
Nursery/Landscape Industry

Introduction

North Carolina State University (NCSU) Arboretum, located in Raleigh, North Carolina, opened in 1980. This eight acre arboretum has a collection of approximately 5,000 species or cultivars of herbaceous and woody plants, as well as a series of display gardens. The arboretum has a dual function; one, to serve as an outdoor classroom for students in horticulture and related fields of study at NCSU and two, to provide a research facility for the evaluation and display of a wide range of landscape plants for Southeast United States.

This program has a simple design of three components: clonal selection, testing and extensive promotion as illustrated in figure 13. It is an informal program which operates with limited resources and emphasizes promotion of plants already in this country. It is difficult to determine the number of plants that have been accepted in the nursery trade as a result of this work. However, in the past ten years, the program has promoted and brought to the attention of the horticulture world hundreds of plants.

# Plant Sources:



**Figure 13. North Carolina State University Arboretum  
Program Model**



### Resources

NCSU Arboretum Program is organized and run by one individual, a professor in the Department of Horticultural Science at NCSU. This professor has many attributes which have contributed to the success of his work. He is a knowledgeable plantsman with extensive experience in plant collecting, propagation and cultivation. Well respected by those in the commercial nursery industry and public horticulture, his numerous contacts help him acquire and promote superior plants. In addition, he is an excellent teacher who has inspired students of production as well as landscape architecture to recognize the merits of superior plants. The author will refer to this individual as the coordinator, throughout this section.

Staff working with plant introductions includes a full time technician, a summer student intern and 30% of the coordinator's time. Facilities include 8 acres, a lath house, container nursery and storage building. The entire arboretum is used as a test site; plants remain in place for 5 to 10 years and are removed to make room for new materials.

In 1987, NCSU provided funding of \$4,200. An additional \$7,000 came from memberships and gifts and the

coordinator generated \$8,000 from personal funds and lectures. Annual cost of this program is approximately \$20,000.

### Purpose

The goal of this introduction program is

To affect the range and variety of plants  
produced and used in the North  
Carolina/southeastern United States  
landscape/nursery industry (Raulston 1986b).

Major emphases are placed on testing to determine plant's responses to low chilling hour accumulation, shorter photoperiods and high summer night temperatures. Plants which prove to be superior are further promoted to nurserymen. According to the coordinator, his goal is to get at least one commercial grower to produce each plant.

A secondary goal is to make people everywhere more aware of good plants. The coordinator is a true "plant advocate" in that he promotes superior plants all across the United States and in foreign countries. It is not the intention of this program to name and register new plants, gain recognition for these selections or benefit monetarily.

### Plant Sources

Plants for testing come from numerous sources, such as commercial nurseries in North America, Asia, Europe and New Zealand or seed exchanges with botanic gardens throughout the world. Some plants come from other introduction programs, such as the University of British Columbia Botanical Garden. Cuttings are gathered from arboreta and public gardens in many countries. While some plants for testing are new or rare, others have been available in this country, but not accepted by the nursery trade (Raulston 1988a).

In addition, collections are made from wild native stands in the U.S. or foreign countries. In 1985, a donation from the North Carolina Nurserymen's Association enabled the coordinator to participate in the U.S. National Arboretum's Korean collecting expedition. Over 9,000 plants from that trip were grown for testing at NCSU.

### Testing

All decisions regarding plant testing and selection are made by the coordinator. Plants are observed from the time they arrive until they are eventually removed. The system is very informal; there is no set length of time for evaluation, no standardized forms, no cooperators and no

written documentation for each plant. Plants are temporarily labeled and accessioned (Raulston 1986a).

### Promotion

Numerous outlets are used to promote these selections. One of the most effective ways is through the distribution of plant materials. Annually 25-30 superior plants from the NCSU Arboretum's collections are propagated and distributed to nurserymen at the North Carolina Nurserymen's Short Course. Two hundred "gift packs" are prepared with one rooted cutting of each cultivar and information leaflets describing each plant. In this manner 5,000 new or uncommon plants are distributed across the state. As growers observe these plants, interest is generated and many begin to produce and promote the superior plants.

Commercial growers are also encouraged to come to the Arboretum and collect propagation material. Currently, an average of two to three growers per week come from local areas, as well as distant places such as New Jersey, Tennessee and Georgia. Approximately 100-150,000 cuttings are taken annually.

For plants which have been promoted for four to five years with no local acceptance, major growers in other parts of the United States are contacted to see if they would be interested in growing and promoting the selection. This arrangement has worked with a number of growers, who receive budwood of the selection for stock increase. University policy strictly forbids selling any plant materials to generate funds for the program; all plants and cuttings are distributed free.

The program has developed a 20 page "Catalog of Choice, Rare and Unusual Plants" which lists 250 North Carolina or mail order firms handling specialty plants. It is distributed free to local producers to encourage them to purchase liners of unusual plants. The coordinator writes a monthly newsletter for the Arboretum membership and propagates several thousand plants for distribution. He gives numerous talks across the country and may be in as many as seven states in one month promoting these plants. Since the program began, 275 lectures have been given to 23,000 people on these selections.

To increase public awareness of these selections, plants are placed in high visibility locations where they can be seen by people who do not frequent public gardens. Recently 125 witchhazels were purchased from New Zealand

and sold at cost to various gardens, garden centers and individuals for planting out.

The coordinator teaches both production and landscape architect students in courses at NCSU. He feels that this is a good way to promote new plants to students who will form the next generation of producers and consumers in the plant industry. When these students become professionals, hopefully they will have a better understanding of the potentials of a wide range of plants.

Other methods used to promote plants include presentations at short courses, trade shows, botanic gardens, arboreta, and professional meetings. Most recently articles have been written for American Nurserymen.

### Conclusions

This program is a testimonial to the abilities of one individual. The coordinator, with minimal support from the University and no written evaluation system, has met the NCSU Arboretum goal to improve the range and variety of plants used in the landscape/nursery industry in southeastern United States. From his numerous contacts across the U.S. and foreign countries large numbers of plants for testing in North Carolina have been acquired. As

a result, hundreds of plants with potential merit have been brought to the attention of the horticulture field.

The strength of this program is a result of the enthusiasm, dedication and extensive plant knowledge of the coordinator. Well known in the United States at nurseries, public gardens and universities, he is respected for his judgment and abilities. He epitomizes the plant advocate; collecting, testing, and promoting plants at every opportunity.

Since this program is the result of one individual's work, it is uncertain what would happen if the coordinator left the arboretum. The goals of the program are incorporated in the mission statement of the arboretum, however it is doubtful that one individual could replace the current coordinator and make the program work with 30% of the time spent in the program and 70% teaching.

University policy forbids the program to sell plant materials to generate funds. As the program gains more recognition, demands for plant materials may reach a point where it is not possible to supply all materials requested given the resources available. At the moment the coordinator generates much of his own income through lectures and donations from individuals and the nursery industry.

This model shows what can be accomplished with limited resources and a dedicated individual. The author hesitates to recommend a similar system for other institutions, where the entire program is dependent upon one individual with little financial support from the institution.





CHAPTER 3  
GUIDELINES FOR DEVELOPING A WOODY PLANT INTRODUCTION  
PROGRAM

Examining the Mission Statement

Successful plant introductions programs are the result of careful planning. Ideally, they have written goals and objectives, adequate resources and strong leadership. Before initiating an introduction program, one needs to carefully consider the purpose of the program and the available resources of the institution.

This process begins with an examination of the institution's overall mission. It is important for the objectives of the introduction program to be compatible with the goals of the institution. Many of the programs examined in this paper were designed to better fulfill goals of the institution. For example the mission of the Minnesota Landscape Arboretum is to test, evaluate and introduce plants for landscape use in Minnesota; their Breeding, Selecting and Evaluation of Landscape Plants Program was designed to help achieve this goal. For an institution that is primarily concerned with display

and/or education, an introduction program may be tangential to their goals. Although receiving initial support from a strong plant advocate on staff, a change in leadership sometimes results in a lack of interest and/or funding. One of the best ways to ensure continuity in a plant introduction program is to build upon the goals outlined in the mission statement.

### Analyzing Resources

The next step in the introduction program design should be an analysis of the institution's resources; including personnel, facilities and funding. An introduction program should maximize resources, without overburdening staff and operating budgets. Although no two introduction programs will be exactly the same, it may be helpful to select an appropriate model from those presented in this paper, to use as a guide.

For institutions with limited resources, the best program model might be the plant advocate program. A typical annual budget is \$15,000 to \$20,000, which includes partial salaries, supplies and travel. Although these programs are small, they are effective in promoting superior plants. A strong plant advocate on staff is critical to the success of this program. Plant advocate

programs generally do not gain as much recognition as more sophisticated models, however, it is possible to generate enough revenue through the sale of stock plants to be self-supporting, as seen in the Arnold Arboretum model.

If an institution wants an introduction program that will make a major impact on the horticulture industry in their region, a good program model would be the University of British Columbia Botanical Garden (PISBG). This type of program requires a large commitment in personnel, time and funds. PISBG was designed, over a two year period, by a team of nurserymen, landscape architects and contractors, and University staff. Initial funding the first year was 140,000 Canadian dollars, tapering off to an annual budget of \$100,000. Financial support for an introduction program of this scope is best obtained through a major grant.

Adequate facilities are needed for an introduction program. At a minimum they should include a greenhouse or propagation facility, an over wintering structure and field or nursery plot for testing. If plants are to be grown on a commercial scale, additional space will be needed for container production.

### Designing the Program

Following an analysis of the institution's available resources, clear goals and objectives should be formulated and written for the introduction program. These goals need to be focused and should include 1) sources of plants for testing, such as breeding, native, Asiatic, 2) types of plants for testing, examples include shade trees, roses, perennials, shrubs, ground covers and 3) geographic range of testing. It is also beneficial to identify program components, such as testing, selection, naming, registration, patenting and promotion. A flow chart is a good way to graphically illustrate the way the program will function. If program design involves committees, each should have a written purpose statement so there is no confusion over responsibilities.

In setting up a budget the following costs need to be considered; labor, materials and supplies (such as containers, media, chemicals), shipping costs, overhead (for equipment, buildings, and land), travel, publicity, and administrative costs. A budget for the first five years of operation should be set up, including sources of funding.

Regardless of the program model selected, all introduction programs need to have strong leadership. Ideally one individual should be selected who has a thorough understanding of the plant evaluation process, contacts in the botanical garden/arboreta world and commercial nursery industry, and the personality to foster excitement and enthusiasm for this work.

Initial contacts with the commercial nursery industry in the local and regional area are important. Talking with local growers, landscape architects and contractors, helps one gain a feel for the retail market and the type of plants that would best serve a need in the industry. The most successful programs have been those that work closely with the nursery industry. A common mistake in introduction programs is to release plants which are too difficult and costly to produce.

### Plant Sources

Plant materials for testing may come from a wide range of sources such as the institution's collections, native and wild collections, or index semina. It is important that plants obtained for testing are true-to-name. Ideally, information on the plant's habitat, longitude and latitude, and field characteristics are

recorded in field notes at the time of collection. Each parent plant needs its own accession number and should be well-labeled and documented at all stages of the introduction process.

### Testing

Initial testing and screening of plants usually occurs at the institution, prior to any distribution. Only plants with superior qualities should be considered for further testing; inferior plants should be discarded. Plants which are aggressive and could escape, becoming naturalized in this country, should be carefully evaluated before testing.

There are numerous methods for data collection, ranging from informal observation to the use of standardized data sheets, as seen in appendices, page 189. A standardized form helps to maintain continuity in the program as staff change and if several individuals collect data. When test results are published a data collection system that streamlines the operation is most efficient. For example, Minnesota Landscape Arboretum enters their data into a small hand held computer which is later downloaded to a database program in a microcomputer. This makes information more accessible and easier to organize

for future publication.

### Cooperators

In designing the testing phase of the introduction program, cooperators can be used effectively to increase the climatic range of testing. Adding cooperators to an introduction program, takes time and resources. Four common mistakes are made in working with cooperators; poor initial selection, loss of control due to absence of a legal agreement, complex evaluation forms, and little or no follow through on the part of the initiator. Each of these problems can be avoided by careful selection and planning.

A good way to select cooperators is to design a set of criteria. To become a cooperator at the U.S. National Arboretum one must have a keen interest in the particular genus, knowledge of the plants being evaluated with a basis for comparison, and willingness to set aside land for testing. Additional considerations include the reputation and reliability of the cooperator and geographic region of the country. Ideally, cooperators should already have a system in place for testing plants.

Cooperators who meet these criteria and are willing to make a commitment should sign a legal agreement with the initiator that will prohibit the propagation and



distribution of any test plants until authorized by the initiator (see appendices, page 202). This type of control is an important element in an introduction program, when an institution wants to gain recognition and/or generate revenue for their introductions. Legal agreements give the program the right to release only those plants which they feel are superior, thus establishing a reputation for high quality. In addition cooperators are prevented from patenting a superior plant, without the initiator's approval. And the agreement limits the number of similar introductions in the market, too many hybrids of the same parentage often diminishes the merit of the superior plant.

One way cooperators provide valuable data on test plants is by completing and returning evaluation forms. Common complaints about these forms are they are too numerous, too long and detailed and difficult to fill out. The best results have been obtained using simple forms that are easy to read and complete. A system that works for one programs is an annual evaluation form with a numerical 1-5 rating on seven characteristics (see appendices, page 195). Some introduction programs have found that the most valuable information comes from the cooperator's comments. When evaluation forms are not returned a follow up letter should be sent. If cooperators consistently fail to respond, initiators need to reconsider the cooperator's

future participation.

A good way to foster a commitment to the program is through careful follow-up of the cooperator's participation. An annual visit to each cooperator site helps ensure that plants are properly maintained and tested. It also provides an opportunity to discuss cultural problems with the test plants, and get feedback on ideas for future work. Open communication and mutual respect between cooperator and initiator should be cultivated.

### Promotional Strategies

Promotion is a critical component of plant introduction programs. Without a variety of promotional channels, even the best selections will go unnoticed by the industry. One good way to promote introductions is to work closely with the nursery and landscape industry. A not-for-profit institution should try to develop a mutually beneficial relationship with local nursery people. This can be achieved by participating in nursery associations, bringing exceptional plants to their attention and allowing the collection of plant materials for propagation from the not-for-profit institution. Nursery people can provide feedback on trends in consumer purchasing and help solve propagation and cultural problems. When designing a

program, consider inviting nursery people to be on the evaluation committee and/or become cooperators. If a high degree of interest and enthusiasm is generated for selections during testing stages, nurserymen become far more active in the promotion of plant introductions. Equally important is the development of a relationship with landscape architects and contractors. These individuals are major users of plant introductions and can also provide valuable feedback on trends in landscape plantings. Cooperative efforts between public gardens, and the nursery and landscape industry have proven to be effective in promoting plants. There is little point in releasing a plant that the horticulture industry does not need.

Professionally designed promotional materials are good vehicles for visually selling introductions. Some programs have color brochures, labels, tags, folders and posters for each introduction. These are generally sold to licensees and retailers. Charges for brochures represented in this paper range from 3 cents to 25 cents a piece. With the introduction program producing large quantities at one time, it keeps the cost of these materials low. Licensees can afford to purchase a small number at a reasonable price. Otherwise they would not be able to afford to produce similar materials for the introduction.

There are numerous ways to promote introductions. Some channels include press releases, newsletters, professional journals, television and radio, trade shows, open houses, presentations at short courses, public gardens and professional meetings. Cultivate good relationships with the local press, as well as national organizations such as Garden Writers. Each year at the Eastern Regional International Plant Propagator's Society there is a new plant forum, which gives member's a chance to promote new plants.

#### J. Franklin Styer Award of Garden Merit

A new promotional program is the J. Franklin Styer Award of Garden Merit, administered by the Pennsylvania Horticultural Society. The program is designed to provide information about new and underused woody ornamental plants which exhibit exceptional garden merit. Given in two stages, the first award is the Certificate of Preliminary Commendation which is judged on written entries accompanied by slides. Plants are awarded for their potential garden merit. The second stage is field testing in botanical gardens, arboreta and private gardens in the Mid-Atlantic States. Plants which prove to be superior in these trials are awarded the J. Franklin Styer Award. The committee

strongly recommends that winning plants be registered with the appropriate authorities and an active program of propagation for distribution be underway.

Plants receiving the award are promoted through the publication of an article in the Green Scene, press releases are sent to major publications and news releases go out to horticultural publications, garden writers and horticultural institutions. The first awards were made and announced in January 1988.

#### All-America Rose Selections

An organization that has been highly successful in promoting a single genus is the All-America Rose Selections. The model used by this program is worthy of consideration.

Immediately after the passage of the Plant Patent Act in 1930, the market became flooded with new rose introductions, many of which were inferior in quality or performance. It quickly became apparent to rose hybridizers and nurserymen that a system of testing was needed to select superior roses. In 1938, rose growers and introducers developed the All-America Rose Selection (AARS) to meet this need. The objective of this non-profit

organization is:

to test new rose originations, to give recognition in the form of an All-America Award to the new rose candidates which have proved outstanding in the trials and to acquaint the press and the gardening public of this nation and Canada with the award winning rose (AARS 1983).

In order to meet this objective a formal testing program was designed. There are 22 official AARS test gardens across the country, primarily at universities and public gardens. These sites must meet the requirements of the AARS Test Committee. Judges are carefully selected and serve a two year apprenticeship prior to judging.

Anyone may enter a new rose variety into the trials by paying an entry fee and supplying plants to each test garden. Varieties are tested in five classes for two years. Roses scoring in the top bracket of each class are considered for selection by the AARS Test Committee. Annually an average of four rose varieties receive the award.

In addition to the test sites, there are 121 AARS approved public rose gardens in the United States and Canada. Introducers of winning varieties donate plants to these sites, along with permanent AARS variety markers. This provides the public with an opportunity to see the

latest award winners growing in their local conditions, before they are offered for sale.

Over 2,600 rose varieties have been tested by AARS with 121 winners. Of the 8,000 rose varieties known today, the AARS winners comprise less than 1%, but account for over 40% of the total rose sales (AARS 1983).

This system of selection works well for several reasons. The actual testing process helps to ensure a continuing supply of superior roses for the market. Since roses are relatively inexpensive and one of America's favorite flowers, there is always a demand for the product. A strong promotional component creates excitement surrounding the announcement of the annual AARS winners. The public is familiar with AARS through extensive advertising in publications, display gardens and garden centers. AARS winners are recognized as superior plants.

### Plant Patents

A plant patent grants to the plant inventor the exclusive right to exclude others from asexually reproducing, selling or using the plant. The plant owner can license other growers to reproduce, sell and use the patented plant. The payment of a royalty may be required

for these privileges. Plant patents are granted by the U.S. Patent Office for a non-renewable term of 17 years. Under the Plant Patent Act there are three classes of new and distinct varieties: sports, mutants and hybrids. In order to obtain a plant patent the inventor must prove that the new variety was a result of a deliberate act, such as a seedling found in a cultivated area, sport resulting from bud variation or the product of a hybrid cross.

To obtain a plant patent the inventor (hybridizer or discoverer) files a patent application with the Patent and Trademark Office. This written document includes a detailed description of the plant, information on origin or parentage and accurate drawings or photographs. Preparation of this application requires not only scientific knowledge, but a good understanding of patent laws and the Patent and Trademark Office practices. For this reason, a registered patent attorney is usually employed to file the application and represent the inventor before the Patent and Trademark Office. This helps insure the application is correctly written and problems are dealt with effectively.

Once the application is filed it takes from 18-24 months to be processed. During this time a label with the initials, PPAF (Plant Patent Applied For) can be placed on the plant with patent pending. Royalties can be collected



during this time, however if the application is denied the royalties must be returned, plus interest. Fees for plant patents in 1988 are \$220 for each application and \$280 issue fee. Legal fees for one plant average \$1,000 per application.

Considerable thought should be given to the use of a plant patent for a new introduction. There are two major benefits realized by using plant patents. One, is the monetary gain from the collection of royalties. Plant patents were originally designed to act as an incentive for achievements in plant breeding and horticulture. A superior hybrid shrub or tree may represent 10-30 years of research. A plant patent allows a breeder to recoup some of these costs. Second, a plant patent provides the inventor with a high degree of control. With exclusive rights to exclude others from reproducing or selling the plant, licensees or growers can be chosen by the inventor for qualities such as honesty and integrity in plant production.

There are several draw backs to using plant patents. The process to obtain a plant patent is time consuming and costly. Although a plant patent legally excludes others from reproducing the plant, there is no guarantee that royalties can be collected. Some not-for-profit institutions have found that is extremely

difficult to enforce patents and collect royalty fees. When a producer does not pay royalties, litigation is costly and potentially damaging to a public image. Since one plant patent costs approximately \$1500, the new introduction must generate considerable sales before patenting costs are recouped. Large profit institutions have not had major problems collecting royalties, they have an effective system for monitoring the sales of their licensees and can afford the high costs of litigation if necessary.

A plant patent is not a guarantee of quality or merit. Any plant can be patented if it is "distinct and new." Since the enactment of the Plant Patent Act in 1930 to 1973, over 3,500 plant patents have been granted. Plant patents are often viewed as the trademark of a superior plant. However, in many instances, this is not the case.

Since plant patents are designed to exclude others from reproducing the plant, they tend to restrict the distribution and promotion of plants. If one of the goals of a plant introduction program is make the plant available to a wide geographic range, a patent can act as a deterrent. A strong promotional campaign will be needed to create a demand for introductions and overcome the restricting influence of the plant patent.

A final problem stems from the fact that plant patents are granted for a non-renewable 17 year term. Some plants, especially woody trees and shrubs, take a number of years to promote and create a market demand. Discov-Tree Research found that some of their early shade tree introductions took 13 years to reach full production. With a 17 year patent only four years of royalty collection remained. As a result of the plant patent being non-renewable, commercial nurseries are trying to maintain some control over their introductions through the use of trademarks.

### Trademarks

A trademark is a word, symbol, logo, slogan, design or combination word and design, which identifies and distinguishes the goods or services of one party from those of another. The term of Federal trademark registration is 20 years and is renewable indefinitely. To register a trademark, a search is done to ensure the name or logo has not been trademarked before and then an application is filed with the Patent and Trademark Office in the U.S. Department of Commerce. The application includes general information on the use of the trademark, a drawing of the mark, and five specimens showing its use in connection with goods and services. Trademark applications are easier than

plant patent applications and generally do not require the services of a lawyer. Application fee is \$200.

A cultivar name cannot legally be trademarked. However, there are instances where this has been done. To understand the problems this creates, think of the cultivar name of a plant as equivalent to the generic name of a product. There is only one generic name for every product, but producers are entitled to use their own trademark or brand name. Since there are numerous producers, the same generic product might have many brand names. If someone trademarks the generic name, others producers are illegally excluded from using the cultivar name. Since there is no affiliation between plant registrars and the trademark office, it is virtually impossible to cross-reference trademark names and cultivar names. Great confusion has occurred over the use of cultivar names and trademarks.

Trademarks are used as a promotional tool. In some cases commercial nurseries have deliberately selected an unattractive cultivar name, patented the plant and promoted it using the trademark name, instead of the cultivar name. For example, Monrovia nursery has a cultivar, Magnolia grandiflora 'Monlia' with the trademark name Majestic Beauty TM Magnolia. In promotional materials the cultivar name is used sparingly and the trademark used extensively.

The public, and even other commercial nurseries pick up on the trademark name instead of the cultivar name. Over time the plant is referred to primarily by the trademark name. In some cases, the single quotations used to denote a cultivar name have been applied to trademark names. Even horticultural references books have made errors using trademark names.

There is no easy solution to this problem. Commercial nurseries feel that if they are going to invest heavily in the promotion of a plant, they want to have exclusive right to the trademark name. Even nurseries that follow proper procedures and use a different cultivar and trademark name are contributing to the confusion surrounding the correct use of nomenclature.

For additional information on plant patents and trademarks contact the U.S. Department of Commerce, Patent and Trademark Office, Washington, D.C.

### Conclusions

This chapter has outlined many of the factors that should be considered in designing and developing a plant introduction program. No two programs will be exactly alike, each should be tailored to serve the needs of the

institution, the geographic region and the horticulture industry. Key factors to success begin with a careful examination of the institution's mission statement and resources. Thorough planning and design should include written goals and objectives, five year budget, and flow chart illustrating the program components. A working knowledge of plant registration, patenting and trademarking is essential. A promotional program should be carefully designed to maximize resources, while reaching the largest audience. Open communication and participation with the horticulture industry should be fostered. Strong leadership is needed to achieve goals and objectives. An individual with a understanding of the plant introduction process, a good working relationship with the horticulture industry and the enthusiasm and energy to inspire others is critical to the success of an introduction program.



## CHAPTER 4

### DIRECTORY OF SELECTED WOODY PLANT INTRODUCTION PROGRAMS IN THE UNITED STATES AND CANADA

#### Categorical Listing

##### Commercial

Conard-Pyle Company  
Discov-Tree Research and Development  
Lone Star Growers  
Monrovia Nursery  
Weyerhaeuser Company

##### Plant Breeding Programs

Agriculture Canada Research Station  
Minnesota Landscape Arboretum  
U.S. National Arboretum

##### Plant Selection Programs

Brookside Gardens  
Chicago Botanic Garden  
Royal Botanical Gardens  
North Central Regional Plant Introduction Station  
Saratoga Horticultural Foundation  
Texas Agricultural Experiment Station  
University of British Columbia Botanical Garden  
United States Department of Agriculture, Soil Conservation  
Service

##### Plant Advocate Programs

Arnold Arboretum  
Los Angeles State and County Arboretum  
North Carolina State University



Alphabetical Listing

Agriculture Canada Research Station - Morden, Manitoba, Canada

Arnold Arboretum - Jamaica Plains, Massachusetts

Brookside Gardens - Wheaton, Maryland

Chicago Botanic Garden - Glencoe, Illinois

Conard-Pyle Company - West Grove, Pennsylvania

Discov-Tree Research and Development - Oquakwa, Illinois

Lone Star Growers - San Antonio, Texas

Los Angeles State and County Arboretum - Los Angeles, California

Minnesota Landscape Arboretum - Chanhassen, Minnesota

Monrovia Nursery - Azusa, California

North Central Regional Plant Introduction Station - Ames, Iowa

North Carolina State University - Raleigh, North Carolina

Royal Botanical Gardens - Hamilton, Ontario, Canada

Saratoga Horticultural Foundation - San Martin, California

Texas Agricultural Experiment Station - College Station, Texas

University of British Columbia Botanic Garden - Vancouver, British Columbia, Canada

United States Department of Agriculture - Soil Conservation Service - Beltsville, Maryland

U.S. National Arboretum - Washington, District of Columbia

Weyerhaeuser Company - Irvine, California

**Agriculture Canada Research Station**

**Program name:** Prairie Regional Trials for Woody  
Ornamentals

**Program type:** Plant Breeding

**Address:** Morden Research Station  
PO Box 3001  
Morden, Manitoba ROG 1J0

**Contact:** Dr. Campbell Davidson, Plant Breeder

**Phone:** (204) 822-4471

This program began in 1959 and is sponsored by the Western Canadian Society for Horticulture. Approximately 1200 accessions, from plant breeding and clonal selections, have been tested by up to nine cooperators across the prairies. The primary purpose of this program is to identify plants which exhibit improved cold hardiness for the Prairie Provinces of Canada. Introductions have been registered through the Canadian Ornamental Plant Foundation.

**Arnold Arboretum**

**Program Type:** Plant Advocate

**Address:** The Arbor Way  
Jamaica Plain, Massachusetts 02130

**Contact:** Gary Koller, Horticulturist

**Phone:** (617) 524-1718

Plant introduction has been an important part of the mission of the Arnold Arboretum since it was founded in 1872. Currently four plant advocates, each with their own area of expertise, work as a team to identify, select, test and promote superior plants. The goal of the program is to introduce and promote woody and herbaceous plants which have potential for northeastern United States. Promotion is a strong component of the program.

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**Brookside Gardens**

Program name: Plant Evaluation Program

Program type: Plant Selection

Address: Maryland-National Park & Planning Commission  
1500 Glenallan Avenue  
Wheaton, Maryland 20902

Contact: Phil Normandy, Curator

Phone: (301) 949-8231

This program was based upon a finite number of plants collected in Korea and Japan from 1976 to 1982. Twelve cooperators have evaluated over 75 accessions for a five year period. Program goals are to introduce superior cultivars and species into the park system and, to evaluate plants formally at Brookside and selected sites across the country with the aim of introducing superior plants into the nursery trade.

**Chicago Botanic Garden**

Program name: Chicagoland Grows

Program type: Plant Selection

Address: P.O. Box 400  
Glencoe, Illinois 60022

Contact: Dr. Roy L. Taylor, Director

Phone: (312) 835-5440

The introduction of superior hardy plants with year round interest for the Chicago region, is the goal of this program. Initiated in 1986, it was modeled after the University of British Columbia Botanical Garden Program (PISBG). Coordinated by Chicago Botanic Garden, the program works in cooperation with the Morton Arboretum in Lisle, Illinois and the Ornamental Growers Association of Northern Illinois. Chicagoland Grows differs from PISBG in two ways; a legal committee has been added to the program model and the major source of plants for testing will come from plant breeding programs at Chicago Botanic Garden and the Morton Arboretum.

**Conard-Pyle Company**

Program name: Rose Introduction Program

Program type: Commercial

Address: Rose Hill Road  
West Grove, Pennsylvania 19390

Contact: Steve Hutton, Vice President of Production

Phone: (215) 869-2426

Since 1908, Conard-Pyle has specialized in the introduction of roses, with 305 introductions since 1919. Through an extensive process, 600 hybrid accessions are tested annually by Conard-Pyle. Decisions regarding rose selection are made by the owners. Recent introductions are patented, trademarked and marketed. The goal of the company is to produce new and better rose varieties that fulfill a market need. Conard-Pyle is also involved in testing and promoting a wide range of woody shrubs.

**Discov-Tree Research and Development, Ltd.**

Program type: Commercial

Address: Rte 1, Box 286  
Oquawka, Illinois 61469

Contact: Willet N. Wandell, Director

Phone: (309) 867-3001

A program which has its roots in tree selections made as early as 1954, focusing exclusively on the introduction and selection of shade trees. Researchers identify, test and distribute superior clones to cooperators at selected sites. Each introduction is patented and trademarked, with its own unique logo. The objective of the program is to select and test superior plant cultivars, and to introduce and promote acceptable plants for use in urban forestry.

**Lone Star Growers**

**Program Name:** Plant Introduction Scheme for Lone Star Growers

**Program type:** Commercial

**Address:** 7960 Cagnon Road  
Route 9, Box 220  
San Antonio, Texas 78227

**Contact:** Dr. Shannon Smith, Director of Research & Development

**Phone:** (512) 677-8020

The collection, evaluation, production and release of superior plants to Lone Star Grower's present and future market, is the goal of this program. Emphasis is placed on the testing of Texas and Mexican native plants. Lone Star Grower's Research and Development department coordinates collection, evaluation, and production of introductions and works closely with the Sales Department on promotion and marketing.

**Los Angeles State and County Arboretum  
(LASCO)**

**Program type:** Plant advocate

**Address:** 301 N. Baldwin Avenue  
Arcadia, California 91006

**Contact:** Francis Ching, Director

**Phone:** (818) 446-8251

The purpose of this program, to introduce new plant materials for southern California, is also part of the mission statement of the institution. The program focuses on the introduction of imported plants from regions with climates similar to California. The director, taxonomist and superintendent make decisions regarding plant collections and promotion. Working closely with southern California nurserymen, LASCO creates a demand for introductions through a variety of promotional techniques.

**Minnesota Landscape Arboretum**

**Program name:** Breeding Selection and Evaluation of Landscape Plants

**Program type:** Plant Breeding

**Address:** PO Box 39  
Chanhassen, Minnesota 55317

**Contact:** Dr. Harold Pellett, Professor of Ornamental Breeding

**Phone:** (612) 443-2460

Begun in 1963 and reorganized in 1978, the goal of this program is to test, evaluate and introduce superior woody plants for landscape use in Minnesota. Plants for testing come primarily from plant breeding work with the Minnesota Nurserymen's Association provides major input on the focus of plant research. Twenty five cooperators, located in the Midwest, participate in the evaluation process. Royalties on new introductions are collected by the Minnesota Nurserymen Research Corporation from cooperator nurseries nationwide and returned to the Plant Testing Program.

**Monrovia Nursery Company**

**Program type:** Commercial

**Address:** P.O. Box Q  
Azusa, California 91702

**Contact:** Audrey Teasdale, Botanist

**Phone:** (818) 334-9321

Since Monrovia's inception in 1926, plant introduction has been an ongoing activity. The purpose of this program is to identify superior plants to replace plants Monrovia currently grows. Major emphasis is on woody plants with greater cold hardiness and better growth habit. Decisions regarding introductions are made as a group by management. Monrovia utilizes plant patents and trademarks and has a strong marketing program. Approximately 20 new plants are introduced each year.

**North Central Regional Plant Introduction Station**

Program name: NC-7 Regional Ornamental Plant Trials  
Program

Program type: Plant Selection

Address: Regional Plant Introduction Station  
Iowa State University  
Ames, Iowa 50011

Contact: Dr. Mark Widrlechner, Horticulturist

Phone: (515) 292-6507

The goal of the NC-7 Program is primarily to expand the range of useful landscape plants adapted to Midwestern growing conditions. Begun in 1954, an advisory committee makes decisions on budget preparation and collection and selection of plants for testing. Currently 28 cooperators in 18 states evaluate test plants. Data are published on each accession in a ten year report.

**North Carolina State University**

Program type: Plant Advocate

Address: Department of Horticultural Science  
Raleigh, North Carolina 27650

Contact: Dr. J.C. Raulston, Professor

Phone: (919) 737-3132

This is a small program, with limited resources, which is organized and run by one individual. The goal of the program is to increase the range and variety of plants produced and used in southeastern United States and to make people everywhere more aware of good plants. Promotion is a strong component of this program, including annual distribution of 150,000 cuttings to nurserymen, numerous talks to professional organizations and extensive publication.

**Royal Botanical Gardens**

Program Name: Plant Introduction Programme (PIP)

Program type: Plant Selection

Address: P.O. Box 399  
Hamilton, Ontario, L8N 3H8  
Canada

Phone: (416) 527-1158

Contact: Hugh Pearson, Plant Breeder

A new program, begun in 1983, the Plant Introduction Programme is modeled after University of British Columbia Plant Introduction Scheme, serving a different hardiness zone. It is a cooperative effort between the Royal Botanical Gardens, the nursery and landscape industry (Landscape Ontario), and government (Ontario Ministry of Agriculture and Food and Agriculture Canada). Its purpose is to increase the diversity and availability of good garden plants for introduction to the Canadian trade. The first introduction was made in 1987.

**Saratoga Horticultural Foundation**

Program type: Plant Selection

Address: 15185 Murphy Avenue  
San Martin, California 95045

Contact: Lowell Cordas, Director

Phone: (408) 779-3303

Established in 1952, the goal of the Saratoga Horticultural Foundation is to recommend and introduce improved plants for the California landscape. Major emphasis is on plants that can tolerate water stress. Plant testing is conducted at the Foundation, with decisions regarding introductions made by the director. Superior selections are named, registered and promoted to the California nursery trade. Plants are produced on a commercial scale and sold to nurserymen to raise funds for operating expenses.



**Texas Agricultural Experiment Station**

Program name: Native Release Program

Program type: Plant Selection

Address: Texas A & M Research and Extension Center  
17360 Coit Road  
Dallas, Texas 75252

Contact: Benny Simpson, Research Scientist

Phone: (214) 231-5362

This small program is run by one individual. Program design is simple with no cooperators and one test site at present. Begun in 1973, the goal of the program is to identify, select and make available to the Texas nursery industry plants which are resource efficient, i.e. not requiring excess irrigation, fertilizer, insecticides or fungicides. The trademark TAM-REP, Texas A & M Resource Efficient Plants, is used to identify all introductions.

**University of British Columbia Botanical Garden**

Program name: Plant Introduction Scheme of the Botanical Garden (PISBG)

Program type: Plant Selection

Address: University of British Columbia  
6501 N.W. Marine Drive  
Vancouver, British Columbia V6T 1W5  
Canada

Contact: Bruce Macdonald, Director

Phone: (604) 228-4186

This scheme is a cooperative program designed as a joint venture between University of British Columbia, the British Columbia Trades Association and the British Columbia Society of Landscape Architects. Initiated in 1981, the purpose of the program is to introduce new and lesser known plants into the nursery trade in British Columbia. Plant materials are evaluated by a 30 member panel and further tested by cooperators in the U.S. and Canada. Royalties are collected through the Canadian Ornamental Plant Foundation and returned to the PISBG.

**United States Department of Agriculture  
Soil Conservation Service**

**Program type:** Plant Selection

**Address:** National Plant Materials Center  
Building 509 BARC-East  
Beltsville, Maryland 20705

**Contact:** James Briggs, Manager/Plant Specialist

**Phone:** (301) 344-2175

The purpose of the Soil Conservation Service is to find plants to solve conservation needs. Serious problems are identified and plants potentially applicable to solving the problem are assembled. Tested at 24 field Plant Materials Centers (PMC) throughout the United States, plants are assembled from both domestic and foreign sources with international requests directed through the National PMC. Superior plants are approved for commercial release and promoted by the Plant Material Centers.

**U.S. National Arboretum**

**Program name:** Introduction Program for Improved Shrubs and Trees

**Program type:** Plant Breeding

**Address:** Agricultural Research Service  
U.S. Department of Agriculture  
3501 New York Avenue, NE  
Washington, D.C. 20002

**Contact:** Dr. Donald Egolf, Research Horticulturist

**Phone:** (202) 475-4862

Work on plant breeding of trees and shrubs began in 1955 and a formal program to promote introductions was initiated in 1969. The mission of the National Arboretum's program is to improve woody ornamentals for a relatively wide range of the United States. Currently 100 cooperators evaluate hybrid selections for their geographic range. Introductions are registered and promoted by the National Arboretum. Commercial nurseries, called stock increase cooperators, receive liners and produce large numbers of the introductions for wholesale and retail sales.

**Weyerhaeuser Company**

**Program name:** New Products Evaluation & Introduction Program

**Program type:** Commercial

**Address:** 12621 Jeffrey Road  
Irvine, California 92720

**Contact:** Nancy Schweikert, Horticulturist

**Phone:** (714) 552-4132

The purpose of this program is to facilitate the collection and evaluation of plant material not presently under production within Weyerhaeuser Nursery Products Division. The program is coordinated by the Irvine, California site, with major input from 15 Weyerhaeuser nurseries across the U.S. and in the Netherlands. A New Products Committee, with representatives from each nursery, meets biannually to discuss screening/selection priorities, develop market strategies and review potential new introductions.

**Note:** Additional information on European Plant Introduction Programs can be found in the appendices, page 232.

## **APPENDICES**



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CONARD-PYLE COMPANY  
Rose Introductions From 1919

DATE	NAME
1940	<u>Rosa</u> 'Advance'
1948	<u>Rosa</u> 'Alain'
1964	<u>Rosa</u> 'Allegro'
1930	<u>Rosa</u> 'Ami Quinard'
1931	<u>Rosa</u> 'Ami L. Crette'
1932	<u>Rosa</u> 'Amulett'
1934	<u>Rosa</u> 'Anegels Mateu'
1968	<u>Rosa</u> 'Angel Face'
1948	<u>Rosa</u> 'Anna Marie'
1932	<u>Rosa</u> 'Annie Brandt'
1932	<u>Rosa</u> 'Annie de Metz'
1935	<u>Rosa</u> 'Annie Dupeyrat'
1931	<u>Rosa</u> 'Apeles Mestres'
1936	<u>Rosa</u> 'Apricot Glow'
1936	<u>Rosa</u> 'Aribau'
1974	<u>Rosa</u> 'Arizona'
1967	<u>Rosa</u> 'Aventure'
1940	<u>Rosa</u> 'Baby Gold Star'
1961	<u>Rosa</u> 'Banzai'
1952	<u>Rosa</u> 'Baroness Manon'
1975	<u>Rosa</u> 'Bicentennial'
1966	<u>Rosa</u> 'Big Red'
1941	<u>Rosa</u> 'Blanche Mallerin'



1930	<u>Rosa</u> 'Booker T. Washington'
1950	<u>Rosa</u> 'Bo-Peep'
1942	<u>Rosa</u> 'Boudoir'
1940	<u>Rosa</u> 'Bouquet'
1943	<u>Rosa</u> 'Brandywine'
1937	<u>Rosa</u> 'Brazier'
1942	<u>Rosa</u> 'Bright Wings'
1978	<u>Rosa</u> 'Bucbi' - Carefree Beauty <sup>TM</sup> Rose
1964	<u>Rosa</u> 'Camelot'
1963	<u>Rosa</u> 'Candy Stripe'
1948	<u>Rosa</u> 'Caprice'
1933	<u>Rosa</u> 'Catalonia'
1931	<u>Rosa</u> 'Cayetana Stuart'
1926	<u>Rosa</u> 'Cecile Walter'
1977	<u>Rosa</u> 'Charisma'
1951	<u>Rosa</u> 'Charles Mallerin'
1962	<u>Rosa</u> 'Chicago Peace'
1966	<u>Rosa</u> 'Chipper'
1961	<u>Rosa</u> 'Christian Dior'
1936	<u>Rosa</u> 'Christoper Stone'
1952	<u>Rosa</u> 'Cinderella'
1945	<u>Rosa</u> 'Cinnabar'
1945	<u>Rosa</u> 'City of York'
1947	<u>Rosa</u> 'Cl. Mme. Henri Guillot'
1949	<u>Rosa</u> 'Cl. Peace'

1934	<u>Rosa</u> 'Cl. Robinow'
1963	<u>Rosa</u> 'Clair Matin'
1953	<u>Rosa</u> 'Cocorico'
1968	<u>Rosa</u> 'Colorama'
1968	<u>Rosa</u> 'Comanche'
1953	<u>Rosa</u> 'Confidence'
1932	<u>Rosa</u> 'Colette Clement'
1932	<u>Rosa</u> 'Condesa de Sastago'
1963	<u>Rosa</u> 'Crimson Duke'
1973	<u>Rosa</u> 'Crimson Gem'
1943	<u>Rosa</u> 'Crimson King'
1940	<u>Rosa</u> 'Dainty Maid'
1929	<u>Rosa</u> 'Director Rubio'
1983	<u>Rosa</u> 'Dolly Parton'
1943	<u>Rosa</u> 'Don Rose'
1939	<u>Rosa</u> 'Dorothy James'
1931	<u>Rosa</u> 'Dr. Eckner'
1952	<u>Rosa</u> 'Dr. F. Debat'
1940	<u>Rosa</u> 'Dr. Kirk'
1940	<u>Rosa</u> 'Dr. T. Poulsen Improved'
1929	<u>Rosa</u> 'Druschki Rubra'
1931	<u>Rosa</u> 'Duquesa de Penaranda'
1953	<u>Rosa</u> 'Eden Rose'
1931	<u>Rosa</u> 'Editor McFarland'
1931	<u>Rosa</u> 'E.J. Ludding'
1949	<u>Rosa</u> 'Ena Harness'

1967	<u>Rosa</u> 'Europeana'
1937	<u>Rosa</u> 'Faience'
1941	<u>Rosa</u> 'The Fairy'
1942	<u>Rosa</u> 'Fama'
1958	<u>Roas</u> 'Fantan'
1943	<u>Rosa</u> 'Fantastique'
1960	<u>Rosa</u> 'Fascinating'
1939	<u>Rosa</u> 'Feu d'Artifice'
1935	<u>Rosa</u> 'Feu Pernet-Ducher'
1959	<u>Rosa</u> 'Fire King'
1977	<u>Rosa</u> 'Fireside'
1976	<u>Rosa</u> 'First Edition'
1938	<u>Rosa</u> 'Flash'
1944	<u>Rosa</u> 'Floradora'
1943	<u>Rosa</u> 'Fred Edmunds'
1931	<u>Rosa</u> 'Fredrico Casas'
1949	<u>Rosa</u> 'Frensham'
1964	<u>Rosa</u> 'Garden State'
1932	<u>Rosa</u> 'Gertrude Huck'
1939	<u>Rosa</u> 'Girona'
1959	<u>Rosa</u> 'Golden Girl'
1968	<u>Rosa</u> 'Golden Prince'
1940	<u>Rosa</u> 'Good News'
1948	<u>Rosa</u> 'Golden Anniversary'
1943	<u>Rosa</u> 'Golden Harvest'
1932	<u>Rosa</u> 'Golden Moss'

1938	<u>Rosa</u> 'Golden Sastago'
1938	<u>Rosa</u> 'Golden State'
1948	<u>Rosa</u> 'Grace Moore'
1954	<u>Rosa</u> 'Grand'mere Jenny'
1942	<u>Rosa</u> 'Grande Duchesse Charlotte'
1931	<u>Rosa</u> 'Grenoble'
1938	<u>Rosa</u> 'Guinee'
1929	<u>Rosa</u> 'Gunston Hall'
1971	<u>Rosa</u> 'Gypsy'
1951	<u>Rosa</u> 'Happiness'
1933	<u>Rosa</u> 'Harmony'
1933	<u>Rosa</u> 'Henri Pauthier'
1931	<u>Rosa</u> 'Hiawatha Recurrent'
1942	<u>Rosa</u> 'Highland Park'
1940	<u>Rosa</u> 'Home Sweet Home'
1944	<u>Rosa</u> 'Horace McFarland'
1965	<u>Rosa</u> 'Indiana'
1960	<u>Rosa</u> 'Invitation'
1950	<u>Rosa</u> 'Irene of Denmark'
1933	<u>Rosa</u> 'Joan Ross'
1987	<u>Rosa</u> 'Keitoli' - Ferdy <sup>TM</sup> Rose
1987	<u>Rosa</u> 'Koh-sai' - Mikado <sup>TM</sup> Rose
1943	<u>Rosa</u> 'Koralle'
1941	<u>Rosa</u> 'Koronet'
1942	<u>Rosa</u> 'Kronprincesse Ingrid'

1940	<u>Rosa</u> 'Korovo'
1956	<u>Rosa</u> 'Lady Elgin'
1939	<u>Rosa</u> 'Lady Leconfield'
1966	<u>Rosa</u> 'Lady X'
1961	<u>Rosa</u> 'LaFontaine'
1937	<u>Rosa</u> 'La Parisienne'
1962	<u>Rosa</u> 'Lancaster'
1969	<u>Rosa</u> 'Laura'
1957	<u>Rosa</u> 'Lavender Girl'
1931	<u>Rosa</u> 'Leonard Barron'
1933	<u>Rosa</u> 'Leni Neuss'
1929	<u>Rosa</u> 'Li Bures'
1978	<u>Rosa</u> 'Linrick' - Friendship <sup>TM</sup> Rose
1943	<u>Rosa</u> 'Lissy Horstmann'
1940	<u>Rosa</u> 'Little Miss Muffett'
1955	<u>Rosa</u> 'Love Song'
1943	<u>Rosa</u> 'Lowell Thomas'
1934	<u>Rosa</u> 'Lucia Zuloaga'
1935	<u>Rosa</u> 'Lucy Nicholas'
1934	<u>Rosa</u> 'Luis Brinas'
1932	<u>Rosa</u> 'Magdalena de Nubiola'
1941	<u>Rosa</u> 'Majorca'
1936	<u>Rosa</u> 'Margy'
1927	<u>Rosa</u> 'Mari Dot'
1942	<u>Rosa</u> 'Mark Sullivan'

1939	<u>Rosa</u> 'Martha Lambert'	
1987	<u>Rosa</u> 'Meicoublan' - White Meidiland	<sup>TM</sup> Rose
1982	<u>Rosa</u> 'Meicubasi' - Scarlet Sunblaze	<sup>TM</sup> Rose
1986	<u>Rosa</u> 'Meidomonac' - Bonica	<sup>TM</sup> Rose
1983	<u>Rosa</u> 'Meifinaro' - American Independence	<sup>TM</sup> Rose
1981	<u>Rosa</u> 'Meigronuri' - Gold Badge	<sup>TM</sup> Rose
1982	<u>Rosa</u> 'Meijikatar' - Orange Sunblaze	<sup>TM</sup> Rose
1987	<u>Rosa</u> 'Meikrotal' - Scarlet Mediland	<sup>TM</sup> Rose
1986	<u>Rosa</u> 'Meilarco' - Lady Sunblaze	<sup>TM</sup> Rose
1985	<u>Rosa</u> 'Meilotup' - Royal Velvet	<sup>TM</sup> Rose
1985	<u>Rosa</u> 'Meimillan' - Joyful Lyric	<sup>TM</sup> Rose
1986	<u>Rosa</u> 'Meiponal' - Sunny Sunblaze	<sup>TM</sup> Rose
1987	<u>Rosa</u> 'Meipoque' - Pink Meidiland	<sup>TM</sup> Rose
1985	<u>Rosa</u> 'Meinitpar' - Caramella	<sup>TM</sup> Rose
1982	<u>Rosa</u> 'Meizlatif' - Spectra	<sup>TM</sup> Rose
1979	<u>Rosa</u> 'Meinuzenten' - Ambassador	<sup>TM</sup> Rose
1929	<u>Rosa</u> 'Mevr. G.A. Van Rossem'	
1953	<u>Rosa</u> 'Miami'	
1941	<u>Rosa</u> 'Midget'	
1967	<u>Rosa</u> 'Miss All-American Beauty'	
1964	<u>Rosa</u> 'Mister Lincoln'	
1939	<u>Rosa</u> 'Mme. Charles Mallerin'	
1931	<u>Rosa</u> 'Mme. Clara d'Arcis'	
1934	<u>Rosa</u> 'Mme. Cochet-Cochet'	
1934	<u>Rosa</u> 'Mme. Emile Daloz'	

1932	<u>Rosa</u> 'Mme. Eugene Picard'
1928	<u>Rosa</u> 'Mme. Gregoire Staechelin'
1938	<u>Rosa</u> 'Mme. Henri Guillot'
1928	<u>Rosa</u> 'Mme. Louise Treneau'
1936	<u>Rosa</u> 'Mme. Pierre Koechlin'
1928	<u>Rosa</u> 'Mme. Van de Voorde'
1936	<u>Rosa</u> 'Mme. Visseau'
1929	<u>Rosa</u> 'Mrs. Pierre S. duPont'
1952	<u>Rosa</u> 'Mrs. Inge Poulsen'
1941	<u>Rosa</u> 'M.S. Hershey'
1962	<u>Rosa</u> 'Mt. Shasta'
1942	<u>Rosa</u> 'Narzisse'
1930	<u>Rosa</u> 'National Flower Guild'
1931	<u>Rosa</u> 'Nicole'
1934	<u>Rosa</u> 'Nigrette'
1929	<u>Rosa</u> 'Nuntius Pacelli'
1956	<u>Rosa</u> 'The Optimist'
1933	<u>Rosa</u> 'Oswald Sieper'
1930	<u>Rosa</u> 'Paloma Falco'
1931	<u>Rosa</u> 'Pardinas Bonet'
1945	<u>Rosa</u> 'Peace'
1942	<u>Rosa</u> 'Peachblow'
1933	<u>Rosa</u> 'Pedro Veyrat'
1953	<u>Rosa</u> 'Pennsylvania'
1973	<u>Rosa</u> 'Perfume Delight'
1950	<u>Rosa</u> 'Perle de Alcananda'

1969	<u>Rosa</u> 'Pharaoh'
1963	<u>Rosa</u> 'Pillar of Fire'
1958	<u>Rosa</u> 'Pink Peace'
1940	<u>Rosa</u> 'Pixie'
1960	<u>Rosa</u> 'Pixie Gold'
1960	<u>Rosa</u> 'Pixie Rose'
1960	<u>Rosa</u> 'Polka'
1971	<u>Rosa</u> 'Portrait'
1985	<u>Rosa</u> 'Poufli' - Alfie <sup>TM</sup> Rose
1952	<u>Rosa</u> 'Poulsen's Bedder'
1940	<u>Rosa</u> 'Poulsen's Copper'
1942	<u>Rosa</u> 'Poulsen's Pink'
1939	<u>Rosa</u> 'Poulsen's Yellow'
1929	<u>Rosa</u> 'President Briand'
1953	<u>Rosa</u> 'President Eisenhower'
1931	<u>Rosa</u> 'President Plumecocq'
1984	<u>Rosa</u> 'Princess De Monaco'
1937	<u>Rosa</u> 'Radio'
1938	<u>Rosa</u> 'Ramon Bach'
1949	<u>Rosa</u> 'Red Elf'
1956	<u>Rosa</u> 'Red Empress'
1953	<u>Rosa</u> 'Red Favorite'
1974	<u>Rosa</u> 'Red Fountain'
1951	<u>Rosa</u> 'Red Imp'
1942	<u>Rosa</u> 'Red Ripples'



1954	<u>Rosa</u> 'Red Wonder'
1968	<u>Rosa</u> 'Rhonda'
1931	<u>Rosa</u> 'Richardson Wright'
1956	<u>Rosa</u> 'Robin'
1936	<u>Rosa</u> 'Rocheport'
1978	<u>Rosa</u> 'Rosalynn Carter'
1931	<u>Rosa</u> 'Rosella'
1972	<u>Rosa</u> 'Rosy Gem'
1934	<u>Rosa</u> 'Route Mallerin'
1962	<u>Rosa</u> 'Royal Highness'
1962	<u>Rosa</u> 'Rumba'
1959	<u>Rosa</u> 'Royal Velvet'
1936	<u>Rosa</u> 'S. & M. Perrier'
1959	<u>Rosa</u> 'Sarabande'
1961	<u>Rosa</u> 'Scarlet Gem'
1967	<u>Rosa</u> 'Scarlet Knight'
1984	<u>Rosa</u> 'Schanbiran' - Magic Sunblaze <sup>TM</sup> Rose
1984	<u>Rosa</u> 'Schobitet' - Royal Sunblaze <sup>TM</sup> Rose
1930	<u>Rosa</u> 'Schoener's Nutkana'
1964	<u>Rosa</u> 'Sea Foam'
1935	<u>Rosa</u> 'Senora Gari'
1940	<u>Rosa</u> 'Serene'
1934	<u>Rosa</u> 'Shenandoah'
1945	<u>Rosa</u> 'Shining Star'
1971	<u>Rosa</u> 'Shooting Star'

1933	<u>Rosa</u> 'Silvia Leyva'
1960	<u>Rosa</u> 'Simone'
1963	<u>Rosa</u> 'Sincera'
1936	<u>Rosa</u> 'Snowbird'
1963	<u>Rosa</u> 'Snow Fairy'
1931	<u>Rosa</u> 'Soeur Therese'
1974	<u>Rosa</u> 'Sonia'
1933	<u>Rosa</u> 'Souv. de J.B. Weibel'
1931	<u>Rosa</u> 'Souv. de Mme. C. Chambard'
1933	<u>Rosa</u> 'Splendor'
1919	<u>Rosa</u> 'Stammler'
1969	<u>Rosa</u> 'Starburst'
1965	<u>Rosa</u> 'Starina'
1956	<u>Rosa</u> 'Sumatra'
1965	<u>Rosa</u> 'Summer Rainbow'
1954	<u>Rosa</u> 'Sun King'
1960	<u>Rosa</u> 'Suspense'
1965	<u>Rosa</u> 'Sunspot'
1951	<u>Rosa</u> 'Suzon Lotthe'
1963	<u>Rosa</u> 'Swarthmore'
1946	<u>Rosa</u> 'Sweet Fairy'
1951	<u>Rosa</u> 'Symphonie'
1930	<u>Rosa</u> 'Syracuse'
1970	<u>Rosa</u> 'Tamango'
1958	<u>Rosa</u> 'Tapestry'
1950	<u>Rosa</u> 'Tapis Rose'

1931 Rosa 'Thomas A. Edison'  
 1954 Rosa 'Tinker Bell'  
 1936 Rosa 'Tom Thumb'  
 1935 Rosa 'Topaz'  
 1958 Rosa 'Torch Song'  
 1963 Rosa 'Traviata'  
 1933 Rosa 'Urdh'  
 1960 Rosa 'Vassar Centennial'  
 1940 Rosa 'Villa de Nancy'  
 1934 Rosa 'Virginia'  
 1961 Rosa 'War Dance'  
 1935 Rosa 'Warrawee'  
 1978 Rosa 'Wezeip' - Paradise <sup>TM</sup> Rose  
 1980 Rosa 'White Chipper'  
 1957 Rosa 'White Night'  
 1982 Rosa 'Wilblank' - Stardance <sup>TM</sup> Rose  
 1980 Rosa 'Wilbentur' - Pixie Delight <sup>TM</sup> Rose  
 1982 Rosa 'Wildak' - Amber Flash <sup>TM</sup> Rose  
 1982 Rosa 'Wilsma'  
 1942 Rosa 'Yellow Faience'  
 1945 Rosa 'Yound France'  
 1935 Rosa 'Yvonne Millot'  
 1964 Rosa 'Zambra'

DISCOV-TREE RESEARCH AND DEVELOPMENT  
Plant Introductions From 1973

DATE	PLANT NAME
	<u>Acer rubrum</u> - October! Brilliance <sup>TM</sup> Red Maple
	<u>Acer rubrum Drummondii</u> - Silhouette <sup>TM</sup> Drummond Red Maple
1983	<u>Acer saccharum</u> - Commeration <sup>TM</sup> Sugar Maple
1983	<u>Acer saccharum</u> - Legacy <sup>TM</sup> Sugar Maple
	<u>Ailanthus altissima</u> - Metro <sup>TM</sup> Tree of Heaven
1986	<u>Amelanchier x grandiflora</u> 'Autumn Brilliance'
	<u>Betula nigra</u> - Accent <sup>TM</sup> River Birch
1983	<u>Celtis laevigata</u> - All Seasons <sup>TM</sup> Sugarberry
1975	<u>Celtis occidentalis</u> - Prairie Pride <sup>TM</sup> Hackberry
1975	<u>Fraxinus americana</u> - Autumn Applause <sup>TM</sup> White Ash
1975	<u>Fraxinus americana</u> - Champaign County <sup>TM</sup> White Ash
	<u>Fraxinus pennsylvanica</u> - Aerial <sup>TM</sup> Green Ash
	<u>Fraxinus pennsylvanica</u> - Skyward <sup>TM</sup> Red Ash
	<u>Fraxinus pennsylvanica</u> - Urbanite <sup>TM</sup> Red Ash
	<u>Fraxinus profunda</u> - Skyriser <sup>TM</sup> Pumpkin Ash
	<u>Fraxinus quadrangulata</u> - True Blue <sup>TM</sup> Blue Ash
1984	<u>Ginkgo biloba</u> - Shangri-La <sup>TM</sup> Ginkgo
	<u>Gleditsia triacanthos inermis</u> - Perfection <sup>TM</sup> Honeylocust
	<u>Gymnocladus dioicus</u> - Bravo <sup>TM</sup> Kentucky Coffee
	<u>Liquidambar styraciflua</u> - Autumn Enchantment <sup>TM</sup> Sweetgum
	<u>Maclura pomifera</u> - Double O <sup>TM</sup> Osage Orange
	<u>Phellodendron amurense</u> - Macho <sup>TM</sup> Amur Cork

- Prunus padus - Summer Glow <sup>TM</sup> Bird Cherry  
Prunus serotina - Spring Sparkle <sup>TM</sup> Rum Cherry  
Pyrus betulifolia - Dancer <sup>TM</sup> Ornamental Pear  
Pyrus calleryana - Pzazz <sup>TM</sup> Ornamental Pear  
Quercus robur fastigiata - Attention! <sup>TM</sup> English Oak  
  
Syringa pekinensis - Summer Charm <sup>TM</sup> Lilac  
Tilia americana - Legend <sup>TM</sup> American Linden  
Tilia americana - Legend <sup>TM</sup> Linden  
Tilia cordata - Pleasant <sup>TM</sup> Street  
Tilia cordata - Prestige <sup>TM</sup> Littleleaf Linden  
Tilia euchlora - Acclaim <sup>TM</sup> Crimean Linden  
1975 Tilia heterophylla - Continental Appeal <sup>TM</sup> Linden  
Tilia tomentosa - Sterling Silver <sup>TM</sup> Linden  
Zelkova serrata - Autumn Glow <sup>TM</sup> Zelkova

U.S. NATIONAL ARBORETUM  
Plant Introductions From 1961

DATE	NAME
1972	<u>Buxus microphylla japonica</u> 'Morris Dwarf'
1972	<u>Buxus microphylla japonica</u> 'Morris Midget'
1973	<u>Buxus microphylla japonica</u> 'National'
1979	<u>Camellia</u> 'Ack-Scent'
1982	<u>Camellia</u> 'Ack-Scent Pink'
1982	<u>Camellia</u> 'Ack-Scent Red'
1982	<u>Camellia</u> 'Ack-Scent Sno'
1982	<u>Camellia</u> 'Ack-Scent Spice'
1982	<u>Camellia</u> 'Ack-Scent Star'
1982	<u>Camellia</u> 'Ack-Scent White'
1974	<u>Camellia</u> 'Cinnamon Cindy'
1983	<u>Camellia</u> 'Fragrant Joy'
1976	<u>Camellia</u> 'Fragrant Pink Improved'
1981	<u>Camellia</u> 'Frost Pink'
1970	<u>Camellia</u> 'Frost Queen'
1981	<u>Camellia</u> 'Frost Princess'
1984	<u>Camellia</u> 'Sunworshiper'
1976	x <u>Cupressocyparis leylandii</u> 'Silver Dust'
1976	<u>Eurya japonica</u> 'Winter Wine'
1966	<u>Hibiscus rosa-sinensis</u> 'Vulcan'
1988	<u>Hibiscus syriacus</u> 'Aphrodite'
1970	<u>Hibiscus syriacus</u> 'Diana'
1981	<u>Hibiscus syriacus</u> 'Helene'

1987	<u>Hibiscus syriacus</u> 'Minerva'
1966	<u>Ilex</u> 'Accent'
1978	<u>Ilex</u> 'Apollo'
1966	<u>Ilex</u> 'Clusterberry'
1966	<u>Ilex</u> 'Elegance'
1964	<u>Ilex</u> 'High Light'
1961	<u>Ilex</u> 'John T. Morris'
1961	<u>Ilex</u> 'Lydia Morris'
1966	<u>Ilex</u> 'Oriole'
1978	<u>Ilex</u> 'September Gem'
1973	<u>Ilex</u> 'Sparkleberry'
1965	<u>Ilex</u> 'Tanager'
1981	<u>Ilex</u> 'Twiggy'
1982	<u>Ilex</u> x <u>attenuata</u> 'Sunny Foster'
1967	<u>Ilex</u> x <u>koehneana</u> 'Ruby'
1967	<u>Ilex</u> x <u>koehneana</u> 'Jade'
1982	<u>Iris kaempferi</u> 'Blue Zebra'
1982	<u>Iris kaempferi</u> 'Capitol Daddy'
1982	<u>Iris kaempferi</u> 'Enduring Pink Frost'
1982	<u>Iris kaempferi</u> 'Grape Fizz'
1982	<u>Iris kaempferi</u> 'Lasting Pleasure'
1982	<u>Iris kaempferi</u> 'Lavender Krinkle'
1982	<u>Iris kaempferi</u> 'Pink Bunny'
1982	<u>Iris kaempferi</u> 'Royal Fireworks'
1982	<u>Iris kaempferi</u> 'Sky and Mist'
1982	<u>Iris kaempferi</u> 'Violet Vase'

1982	<u>Iris kaempferi</u> 'White Profusion'
1982	<u>Iris kaempferi</u> 'White Ruffles'
1986	<u>Lagerstroemia</u> 'Acoma'
1987	<u>Lagerstroemia</u> 'Apalachee'
1987	<u>Lagerstroemia</u> 'Biloxi'
1967	<u>Lagerstroemia</u> 'Catawba'
1970	<u>Lagerstroemia</u> 'Cherokee'
1987	<u>Lagerstroemia</u> 'Comanche'
1967	<u>Lagerstroemia</u> 'Conestoga'
1986	<u>Lagerstroemia</u> 'Hopi'
1987	<u>Lagerstroemia</u> 'Lipan'
1987	<u>Lagerstroemia</u> 'Miami'
1978	<u>Lagerstroemia</u> 'Muskogee'
1978	<u>Lagerstroemia</u> 'Natchez'
1987	<u>Lagerstroemia</u> 'Osage'
1986	<u>Lagerstroemia</u> 'Pecos'
1967	<u>Lagerstroemia</u> 'Potomac'
1967	<u>Lagerstroemia</u> 'Powhatan'
1970	<u>Lagerstroemia</u> 'Seminole'
1987	<u>Lagerstroemia</u> 'Sioux'
1978	<u>Lagerstroemia</u> 'Tuscarora'
1986	<u>Lagerstroemia</u> 'Tuskegee'
1987	<u>Lagerstroemia</u> 'Wichita'
1987	<u>Lagerstroemia</u> 'Yuma'
1986	<u>Lagerstroemia</u> 'Zuni'
1968	<u>Magnolia</u> 'Ann'



- 1968 Magnolia 'Betty'  
1967 Magnolia 'Freeman'  
1980 Magnolia 'Galaxy'  
1968 Magnolia 'Jane'  
1968 Magnolia 'Judy'  
1967 Magnolia 'Maryland'  
1980 Magnolia 'Nimbus'  
1968 Magnolia 'Pinkie'  
1968 Magnolia 'Randy'  
1968 Magnolia 'Ricki'  
1984 Magnolia 'Spectrum'  
1968 Magnolia 'Susan'  
1987 Malus 'Adirondack'  
1987 Malus 'Naragansett'  
1968 Malus sieboldi 'Fuji'  
1963 Metasequoia glyptostroboides 'National'  
1984 Platanus 'Columbia'  
1984 Platanus 'Liberty'  
1987 Pyracantha 'Apache'  
1970 Pyracantha 'Mohave'  
1978 Pyracantha 'Navaho'  
1987 Pyracantha 'Pueblo'  
1978 Pyracantha 'Teton'  
1966 Pyracantha 'Shawnee'  
1981 Pyrus calleryana 'Capital'  
1977 Pyrus calleryana 'Whitehouse'

	<u>Rhododendron</u> <u>austrinum</u> 'Yellow River'
1971	<u>Rhododendron</u> 'Bowie'
1971	<u>Rhododendron</u> <u>bakeri</u> 'Camp's Red'
1971	<u>Rhododendron</u> <u>prunifolium</u> 'Hohman'
1984	<u>Rhododendron</u> 'Pryored'
1983	<u>Ulmus</u> 'Homestead'
1984	<u>Ulmus</u> <u>parvifolia</u> 'Dynasty'
1983	<u>Ulmus</u> 'Pioneer'
1988	<u>Viburnum</u> 'Conoy'
1987	<u>Viburnum</u> 'Chippewa'
1987	<u>Viburnum</u> 'Huron'
1981	<u>Viburnum</u> 'Eskimo'
1966	<u>Viburnum</u> <u>burkwoodi</u> 'Mohawk'
1981	<u>Viburnum</u> 'Chesapeake'
1966	<u>Viburnum</u> <u>carlcephalum</u> 'Cayuga'
1966	<u>Viburnum</u> <u>dilatatum</u> 'Catskill'
1970	<u>Viburnum</u> <u>dilatatum</u> 'Erie'
1966	<u>Viburnum</u> <u>dilatatum</u> 'Iroquois'
1966	<u>Viburnum</u> <u>lantana</u> 'Mohican'
1978	<u>Viburnum</u> <u>plicatum</u> f. <u>tomentosum</u> 'Shasta'
1986	<u>Viburnum</u> <u>plicatum</u> f. <u>tomentosum</u> 'Shoshoni'
1966	<u>Viburnum</u> <u>rhytidophylloides</u> 'Alleghany'
1972	<u>Viburnum</u> 'Oneida'
1972	<u>Viburnum</u> <u>sargenti</u> 'Onondaga'
1972	<u>Viburnum</u> <u>sargenti</u> 'Susquehanna'
1972	<u>Viburnum</u> <u>sieboldi</u> 'Seneca'

U.S. National Arboretum Field Notes

Hibiscus Field Notes

Code No.:

Cultivar Name:

Flower Type: Single \_\_\_\_\_ Semi-Double \_\_\_\_\_ Double \_\_\_\_\_

Date of Bloom:

First:					
Full:					
Last:					

Color: \_\_\_\_\_  
 \_\_\_\_\_

Outer Petal:

Mid Petal:

Eye Spot:

Stigma:

Flower Measurement:	Diameter	Petal Length	Petal Width
1.			
2.			
3.			
4.			
5.			
Av.			

Comments:

Return to: Donald R. Egolf  
U.S. National Arboretum  
3501 New York Avenue, NE  
Washington, D.C. 20002

1987  
LAGERSTROEMIA SELECTION EVALUATION  
U.S. NATIONAL ARBORETUM

Mr. Joe Solomone  
Leonard Coates Nursery  
400 Casserly Road  
Watsonville, CA 95076

N.A. No.	No. Surviving Plants	Mildew	Hardi- ness	Flower Date	Plant Height	*Ornamental Comments
54971						
54972						

Mildew  
0 = Resistant      2 = Moderate infection  
1 = Slight infection      3 = Severe infection

Hardiness  
0 = No winter damage      2 = Half damaged  
1 = Tips & foliage damaged      3 = Severe to killed

\*Any additional observations as to growth habit, bark coloration, recurrent flowering, adaptability; your opinion

U.S. National Arboretum Cooperator Evaluation Form

## U.S. National Arboretum Standard Form of Memorandum

EXHIBIT 1STANDARD FORM MEMORANDUM OF UNDERSTANDING  
Between

---

(Name of Cooperator)

And the

United States Department of Agriculture  
Agricultural Research Service  
ForEvaluation of Potential New Cultivars of  
Ornamental Shrubs and Trees

## The Service Agrees:

1. To supply the Cooperator with plant material for evaluation, as follows:

## The Grower Agrees:

1. To furnish the land and labor and meet all expenses involved in planting and adequately caring for the plant material.
2. To permit representatives of the Service to make observations of these materials in the field and to obtain samples when desired.
3. Not to propagate additional plants for his own use, nor to sell, give away or otherwise distribute any part of these selections until authorized by the Service to do so.
4. To use the official name or number of the selection, or selections, assigned by the Service in all reference to such selection or selections.

## It is Mutually Agreed:

1. No restrictions shall apply to propagation and disposal of plant material after the selection has been named and officially released by the Service.
2. That all information derived from these studies shall be jointly shared by the Cooperator and the Service.
3. This agreement supersedes existing agreements and shall apply to Service plant material already distributed to the Cooperator for testing.
4. The parent provision applicable to this agreement shall be in accordance with the statement on the reverse of this form.

The responsibilities assumed by the Service are contingent upon funds being available from which the expenditures may be met.

No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this agreement or to any benefit that may arise therefrom, unless it be made with a corporation for its general benefit.

This agreement shall become effective \_\_\_\_\_, and shall continue indefinitely but may be terminated by mutual agreement at any time.

UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH SERVICE

---

Name of Cooperator

By

Name

Title

---

Address

---

MINNESOTA LANDSCAPE ARBORETUM  
Plant Introductions From 1978

DATE	NAME
1980	<u>Acer rubrum</u> 'Northwood'
1987	<u>Cornus sericea</u> 'Cardinal'
1982	<u>Forsythia</u> 'Northern Sun'
1986	<u>Lonicera</u> 'Freedom'
1987	<u>Prunus nigra</u> 'Princess Kay'
1986	<u>Rhododendron</u> 'Orchid Lights'
1983	<u>Rhododendron</u> 'Pink Lights'
1983	<u>Rhododendron</u> 'Rosy Lights'
1984	<u>Rhododendron</u> 'Spicy Lights'
1983	<u>Rhododendron</u> 'White Lights'

### PLANT PERFORMANCE DATA

02, 09/88

PAGE

1

[illegible]

## Minnesota Landscape Arboretum Propagation Agreement

### New Plant Introductions.

The University of Minnesota Department of Horticultural Science and Landscape Architecture releases introductions of hardy plants through the Minnesota Nurserymen's Research Corporation. The Research Corporation coordinates the orderly propagation, production and introduction of these new releases into the nursery trade. Nurseries cooperating in the production of these materials agree to pay a royalty to the Minnesota Nurserymen's Research Corporation. Rate of royalty is set by the research corporation and is based on all plants sold. Funds from the royalties are given to the University Department of Horticultural Science and Landscape Architecture to help support continuation of their research efforts.

### PROPAGATION AGREEMENT

I would like to become a cooperator in the program described above for propagation of \_\_\_\_\_. I agree to pay a royalty of \_\_\_\_\_ for each plant sold while this plant is covered by the royalty agreement. (\_\_\_\_\_) I will furnish an annual report of my plant inventory and sales for each year. I also agree not to sell or distribute plants prior to the release date established by the Research Corporation. Annual report and royalty payments will be submitted by \_\_\_\_\_ July 15 \_\_\_\_\_ each year.

Firm Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_



## Minnesota Landscape Arboretum Cooperator Evaluation Form

PLANT	Year Sent	Winter Injury		Current Approximate Size	Aesthetic Qualities 1-5 Poor 1 to Excellent 5	Pest Problems	Remarks
		Vegetative Tissue	Flower Buds				
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							

Please return completed form to:  
 Harold Pellett  
 University of MN Landscape Arboretum  
 3675 Arboretum Blvd.  
 Chanhassen, MN 55317

NAME AND ADDRESS OF COOPERATOR

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UNIVERSITY OF BRITISH COLUMBIA BOTANICAL GARDEN  
Plant Introductions From 1985

DATE	NAME
1986	<u>Anagalis monellii</u> 'Pacific Blue'
1985	<u>Arctostaphylos uva-ursi</u> 'Vancouver Jade'
1987	<u>Diascia rigescens</u> *
1985	<u>Genista pilosa</u> 'Vancouver Gold'
1985	<u>Microbiota decussata</u> *
1987	<u>Ribes sanguineum</u> 'White Icicle'
1985	<u>Rubus calycinoides</u> 'Emerald Carpet'
1987	<u>Sorbus hupehensis</u> 'Pink Pagoda'
1987	<u>Teucrium scorodonia</u> 'Crispum' *
1986	<u>Viburnum plicatum</u> 'Summer Snowflake'

\* Indicates plant is a recommended species, not a named cultivar.

## University of British Columbia Botanical Garden

## Evaluation Panel Questionnaire

## QUESTIONNAIRE

Evaluation Panel - P.I.S.B.G. Invitation Day, July 15th, 1987

FAMILY

B.G.A.S. NO.

HARDINESS ZONE

DESCRIPTION OF PLANT

## 1. HOW DO YOU RATE THE POTENTIAL OF THIS PLANT FOR THE FOLLOWING SITUATIONS?

- |  |   |   |   |   |   |   |   |   |   |    |
|--|---|---|---|---|---|---|---|---|---|----|
| (a) Sale to Retail Outlets                                   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| (b) Sale <u>from</u> Retail Outlets (Garden centres)         | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| (c) Use by municipalities/highways                           | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| (d) Use by Landscape Architects and<br>Landscape Contractors | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

2a. DO YOU THINK THAT THIS PLANT IS UNIQUE COMPARED WITH OTHER MATERIAL CURRENTLY AVAILABLE  
WITHIN THE B.C. NURSERY INDUSTRY? YES \_\_\_ NO \_\_\_

2b. PLEASE EXPLAIN BRIEFLY WHY.

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3a. DO YOU THINK THAT THIS PLANT SHOULD BE CHOSEN FOR THE P.I.S.B.G. SCHEME? YES \_\_\_ NO \_\_\_

3b. INDICATE THE OVERALL POTENTIAL OF THIS PLANT AS A MARKETABLE PRODUCT ON A  
SCALE OF 1 - 10.

1 2 3 4 5 6 7 8 9 10

## 4. ADDITIONAL REMARKS

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## University of British Columbia Botanical Garden

## Cooperator Evaluation Report

PLANT INTRODUCTION SCHEME OF THE UBC BOTANICAL GARDEN

## EVALUATION REPORT - 1986

NAME OF PLANT: \_\_\_\_\_

Cooperating Test Station \_\_\_\_\_

Address \_\_\_\_\_

Telephone Number \_\_\_\_\_

(1) SITE INFORMATION

Location and Brief Description \_\_\_\_\_

Exposure \_\_\_\_\_ Full Sun      Partial Shade      Full Shade

Hardiness Zone \_\_\_\_\_

Soil Type \_\_\_\_\_

Nutritional Status (attach soil  
analysis if available) \_\_\_\_\_

pH \_\_\_\_\_

(2) PLANTING

Initial Soil Preparation and any \_\_\_\_\_

Herbicide Application \_\_\_\_\_

Date of Field Planting \_\_\_\_\_

Planting Distance \_\_\_\_\_

Plant Losses (prior to first \_\_\_\_\_

winter) - Number and Comments \_\_\_\_\_

on reasons why \_\_\_\_\_

(3) DESCRIPTION OF WINTER DAMAGE (Percentage of aerial portion of plant killed)

Up to: 25%      50%      75%      100% (Total kill -- no regeneration)

100% (Regeneration following spring)

Where applicable, comment on damage to:

a) Foliage \_\_\_\_\_

b) Stems \_\_\_\_\_

c) Roots \_\_\_\_\_

d) Ice Snow Breakage \_\_\_\_\_

e) Wind \_\_\_\_\_

f) Overall Reasons -- Damage/Kill \_\_\_\_\_

#### (4) DESCRIPTION OF PLANT

##### Flowers

1st Flower (approximate date) \_\_\_\_\_

Last Flower (approximate date) \_\_\_\_\_

Peak Flowering Period \_\_\_\_\_

Color \_\_\_\_\_

Were the flowers significant? (Scale of 1-10) [none (1) - excellent (10)] \_\_\_\_\_

Did the flowers look unsightly after flowering? \_\_\_\_\_

##### Fruits

Description: Size \_\_\_\_\_

Color \_\_\_\_\_

Were the fruits significant? [Scale of 1-10 [none (1) - excellent (10)]] \_\_\_\_\_

Approximate date when fruits ripened \_\_\_\_\_

EVALUATION REPORT - 1986 (NAME OF PLANT: \_\_\_\_\_)

PAGE 3

Foliage

Approximate Date of 1st flush \_\_\_\_\_

Approximate Date of leaf fall \_\_\_\_\_

Description \_\_\_\_\_

Were there any significant color changes during the year? (If so, please describe)

\_\_\_\_\_  
\_\_\_\_\_Habit (Please record during 1st week September)

Description \_\_\_\_\_

Overall height (average) \_\_\_\_\_

Overall spread (average) \_\_\_\_\_

Survival rates \_\_\_\_\_

DESCRIPTION OF SUMMER DAMAGE

Where applicable, comment on damage to:

a) Foliage \_\_\_\_\_

b) Stems \_\_\_\_\_

c) Roots \_\_\_\_\_

d) Wind \_\_\_\_\_

e) Overall Reasons for Damage/Kill \_\_\_\_\_

EVALUATION REPORT - 1986 (NAME OF PLANT: \_\_\_\_\_)

PAGE 4

**(5) GENERAL CULTURE**

Details of Maintenance

a) Irrigation \_\_\_\_\_

b) Fertilization \_\_\_\_\_

c) Herbicide \_\_\_\_\_

d) Mulching \_\_\_\_\_

e) Pest and Disease Spraying \_\_\_\_\_

Details of Maintenance Problems (e.g. Sucker growth, retains litter, invasive)

**(6) PEST AND DISEASE INFECTION**

a) Pests

(i) Identification of Major Pests \_\_\_\_\_

(ii) Period of Infection \_\_\_\_\_

(iii) Description and Degree of Damage \_\_\_\_\_

b) Diseases

(i) Identification of Major Pests \_\_\_\_\_

(ii) Period of Infection \_\_\_\_\_

(iii) Description and Degree of Damage \_\_\_\_\_

PLEASE RETURN FORM BY **DECEMBER 31ST 1986** TO: Mr. A. Bruce Macdonald, Acting Director,  
UBC Botanical Garden, 6501 NW Marine Dr., Vancouver, B.C. V6T 1W5 Phone: (604) 228-4187.  
Thank you for your cooperation. Please contact me if you have any questions.

**University of British Columbia Botanical Garden  
Participant Agreement Contract**

**PLANT INTRODUCTION SCHEME OF THE BOTANICAL GARDEN**

**PARTICIPATOR AGREEMENT CONTRACT**

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This contract specifies the terms of reference between **The Participant Nursery** and The University of British Columbia for the production and sales of plants released by the Plant Introduction Scheme of the Botanical Garden, hereafter known as PISBG.

The Participant Nursery agrees to purchase PISBG plants indicated on APPENDIX 1 at the stated price shown. Payment for this initial stock plant material shall be 50% of the full payment at the time of distribution, the remaining 50% payment to be completed within 28 days after receipt of plants.

The Participant Nursery further agrees to produce not less than 20 times the number of plants purchased within the period from receipt of stock plants to March 1, 1988, subject to sufficient seed being made available.

The Participant Nursery further agrees that no plants purchased or propagated from the original plants distributed or from propagation material collected from Botanical Garden stock plants, shall be sold or given away until March 1, 1989. An exception may be exercised if plants propagated are sold to a British Columbia nursery belonging to the B.C.N.T.A. who in turn signs and deposits a copy of the **Subsidiary Participant Agreement Contract** with The Botanical Garden prior to receipt of purchased plants. It will be the responsibility of the selling Participant Nursery to notify The Botanical Garden of any pending sale prior to March 1, 1989 and the name of the purchasing nursery.

The Botanical Garden will provide access to stock plants, if additional material is required. Prior arrangements must be made with the Acting Director of the Botanical Garden. A fee for such material will be negotiated with The Participant Nursery.

The Participant Nursery agrees to pay a royalty on each plant propagated/sold either to COPF for registered introductions or to The Botanical Garden for recommended selections released through the PISBG program that are not registered. Royalty payments per plant are indicated on APPENDIX 1.

The Participant Nursery further agrees that all PISBG plants must carry a PISBG label provided by The Botanical Garden. The labels will be provided by The Botanical Garden at cost plus handling charges and must be ordered at least 60 days in advance of the date required. All plants for retail sales must carry this label.



## University of British Columbia Botanical Garden

## Participator Agreement Contract - Page 2

This contract is signed this \_\_\_\_\_ day of the month of \_\_\_\_\_  
in the year \_\_\_\_\_ between:

## The Participator Nursery

Name: \_\_\_\_\_

Street: \_\_\_\_\_

City: \_\_\_\_\_ Province: \_\_\_\_\_

Postal Code: \_\_\_\_\_ Telephone: \_\_\_\_\_

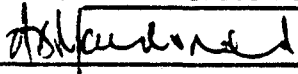
Signing officer: \_\_\_\_\_ Title: \_\_\_\_\_

\_\_\_\_\_  
Signature

and

The University of British Columbia  
The Botanical Garden  
6501 NW Marine Drive  
Vancouver, B.C. V6T 1W5

Telephone: 228-3928 Area Code 604

Signing officer: A. Bruce Macdonald Title: Acting Director  
\_\_\_\_\_  
SignatureSigning officer: James F. Richards Title: Dean, Faculty of  
Agricultural Sciences  
\_\_\_\_\_  
Signature

Saratoga Horticultural Foundation  
Partial List of Plant Introductions From 1952

DATE	NAME
1962	<u>Arctostaphylos bakeri</u> 'Louis Edmunds'
1956	<u>Arctostaphylos densiflora</u> 'Howard McMinn'
1975	<u>Arctostaphylos manzanita</u> 'Dr. Hurd'
1955	<u>Arctostaphylos stanfordiana</u> 'Fred Oehler'
1984	<u>Arbutus</u> 'Marina'
1962	<u>Ceanothus</u> x 'Joyce Coulter'
1952	<u>Ceanothus</u> x 'Julia Phelps'
1956	<u>Ceanothus gloriosus exaltatus</u> 'Emily Brown'
1955	<u>Ceanothus griseus</u> 'Louis Edmunds'
1982	<u>Coprosma</u> 'Verde Vista'
1955	<u>Garrya elliptica</u> 'James Roof'
1964	<u>Giejera parvifolia</u>
1986	<u>Laurus</u> 'Saratoga'
1961	<u>Magnolia grandiflora</u> 'Samuel Sommer'
1982	<u>Maytenus boaria</u> 'Green Showers'
1961	<u>Pistacia chinensis</u> 'Keith Davey'
1979	<u>Populus fremontii</u> 'Nevada'
1975	<u>Rhamnus californica</u> 'Eve Case'

USDA SOIL CONSERVATION SERVICE  
Plant Introductions From 1961

DATE	PLANT NAME
1978	<u>Acer ginnala</u> 'Flame'
1986	<u>Artemisia ludoviciana</u> 'Summit'
1979	<u>Atriplex canescens</u> 'Marana'
1983	<u>Atriplex canescens</u> 'Rincon'
1976	<u>Atriplex canescens aptera</u> 'Wytana'
1979	<u>Atriplex lentiformis</u> 'Casa'
1977	<u>Atriplex semibaccata</u> 'Corto'
1983	<u>Castanea pumila</u> 'Golden'
1982	<u>Celtis occidentalis</u> 'Oahe'
1978	<u>Cercocarpus montanus</u> 'Montane'
1977	<u>Chilopsis linearis</u> 'Barranco'
1980	<u>Chilopsis linearis</u> 'Hope'
1982	<u>Cornus amomum</u> 'Indigo'
1978	<u>Elaeagnus angustifolia</u> 'King-Red'
1961	<u>Elaeagnus umbellata</u> 'Cardinal'
1986	<u>Elaeagnus umbellata</u> 'Ellagood'
1979	<u>Elaeagnus umbellata</u> 'Elsberry'
1985	<u>Elaeagnus umbellata</u> 'Redwing'
1983	<u>Eriogonum fasciculatum</u> 'Duro'
1985	<u>Erythrina variegata</u> 'Tropic Coral'
1973	<u>Euonymus bungeanus</u> 'Pink Lady'
1985	<u>Eurotia lanata</u> 'Hatch'
1979	<u>Fraxinus pennsylvanica</u> 'Cardan'

- 1978 Forestiera neomexicana 'Jemez'
- 1979 Isomeris arborea globosa 'Dorado'
- 1971 Juniperus conferta 'Emerald Sea'
- 1979 Lonicera maackii 'Cling- Red'
- 1970 Lonicera maackii 'Rem-Red'
- 1981 Leucaena retusa 'Yellowpuff'
- 1973 Malus baccata mandshurica 'Midwest'
- 1978 Malus sargentii 'Roselow'
- 1979 Populus canadensis eugenei 'Imperial'
- 1984 Prunus fruticosa 'Scarlet'
- 1981 Prunus spp. 'Rainbow'
- 1984 Purshia tridentata 'Lassen'
- 1986 Quercus acutissima 'Gobbler'
- 1980 Rhus aromatica serotina 'Konza'
- 1983 Rhus trilobata 'Autumn Amber'
- 1979 Rhus trilobata 'Bighorn'
- 1969 Robinia fertilis 'Arnot'
- 1986 Salix alaxensis 'Rhode'
- 1986 Salix barkleyi 'Long'
- 1986 Salix bebbiana 'Wilson'
- 1986 Salix brachycarpa 'Oliver'
- 1983 Salix cotteti x cotteti 'Bankers'
- 1986 Salix lasiandra 'Roland'
- 1975 Salix purpurea 'Streamco'
- 1984 Shepherdia argentea 'Sakakawea'
- 1978 Yucca elata 'Bonita'

NC-7 REGIONAL ORNAMENTAL PLANT TRIALS PROGRAM  
Plant Introductions

DATE	NAME
1960	<u>Ligustrum</u> 'Cheyenne'
mid 1970's	<u>Dianthus</u> 'Smokey'
1986	<u>Forysthia</u> 'Meadowlark'

## NC-7 Ornamental Plant Trials Report of Planting Form

REPORT OF PLANTING

45

LOCATION CODE: 02-03

LOCATION NAME: Palmer, PA

ALTR. NO.

FAMILY:

GENUS:  
SUBSP:SPECIES:  
CULTIVAR:

DATE SHIPPED: 05/07/84

NO. OF PLANTS SHIPPED: 5

-----  
TO BE COMPLETED BY COOPERATOR:

DATE PLANTED: \_\_/\_\_/\_\_ NO. PLANTED: \_\_ PLOT NAME: -----

BUDS ON ARRIVAL: (Circle One)

- 1 DORMANT
- 2 BREAKING
- 3 ELONGATED

ROOTS ON ARRIVAL: (Circle One)

- 1 MOIST AND GROWING
- 2 FROZEN, SOFT
- 3 HEATED, DRY
- 4 COOL, DRY

GENERAL CONDITION: (Circle One)

- 1 GOOD
- 2 FAIR
- 3 POOR

COMMENTS:

SIGNATURE: -----

REPORT DATE: \_\_/\_\_/\_\_

RETURN ASAP TO:  
M. P. WIDRLECHNER  
HORTICULTURIST  
NORTH CENTRAL REGIONAL PLANT  
INTRODUCTION STATION  
IOWA STATE UNIVERSITY  
AMES, IOWA 5001.

## NC-7 Ornamental Plant Trials Plot Information Form

## PLOT INFORMATION

LOCATION CODE: 02-13

LOCATION NAME: Palmer Park

PLOT NUMBER: PLOT NAME:

SOIL TYPE: -----

PLOT TYPE CODE: --- (1-9) Choose One

PLANTING MADE ON:

- 1 = CLEAN TILLED LAND
- 2 = CLEAN TILLED STRIP W/SOD ALLEYS
- 3 = CLEAN TILLED, THEN MULCHED
- 4 = SOD WITH PLANTS MULCHED
- 5 = SOD WITH MULCH ADDED DURING YEAR
- 6 = LATH HOUSE
- 7 = NURSERY ROW
- 8 = GREENHOUSE
- 9 = OTHER: -----

EXPOSURE CODE: --- (1-9) Choose One

PLANTING MADE ON:

- 1 = FLAT (0-3% SLOPE)
- 2 = NORTHWEST SLOPE
- 3 = NORTH SLOPE
- 4 = NORTHEAST SLOPE
- 5 = EAST SLOPE
- 6 = SOUTHEAST SLOPE
- 7 = SOUTH SLOPE
- 8 = SOUTHWEST SLOPE
- 9 = WEST SLOPE

LAND CODE --- 1-9 (IF APPLICABLE)

PLANTING TO BE MADE ON:

- 1 = LAST YEAR'S FALLOW GROUND
- 2 = SOD GROUND PLOWED LAST FALL
- 3 = SOD GROUND PLOWED JUST PRIOR TO PLANTING
- 4 = SOD, SCALPED SPOTS PREPARED PREVIOUS FALL
- 5 = SOD, SCALPED SPOTS PREPARED JUST PRIOR TO PLANTING
- 6 = LAST YEAR'S CROP LAND, FALL PLOWED, NO FURTHER TREATMENT
- 7 = LAST YEAR'S CROP LAND, FALL PLOWED, DISKED PRIOR TO PLANTING
- 8 = OTHER: (DESCRIBE) -----

IRRIGATION POSSIBLE: --- (Y or N)

IRRIGATION PRIOR TO PLANTING: --- (Y or N)

IRRIGATION AT PLANTING: --- (Y or N)

IRRIGATION AFTER PLANTING: --- (Y or N)

PROTECTION TYPE: ----- (SUCH AS WINDBREAK, BUILDING)

PROTECTION DIRECTION: (Circle all that apply) N S E W

NOTE ALL CHANGES BELOW AND RETURN TO:

M. P. WIDRLECHNER  
HORTICULTURIST  
NORTH CENTRAL REGIONAL PLANT  
INTRODUCTION STATION  
IOWA STATE UNIVERSITY  
AMES, IOWA 50011

SIGNATURE: -----

REPORT DATE: --/--/--

## NC-7 Ornamental Plant Trials Performance Report

REPORT FOR 19\_\_ PERFORMANCE REPORT

GENUS: \_\_\_\_\_ SPECIES: \_\_\_\_\_ SUSP.: \_\_\_\_\_  
 CULTIVAR: \_\_\_\_\_ ALTR. NO.: \_\_\_\_\_ YOUR NO.: \_\_\_\_\_  
 LOCATION CODE: \_\_\_\_\_ LOCATION NAME: \_\_\_\_\_ PLOT NO.: \_\_\_\_\_  
 DATE PLANTED: \_\_\_\_\_ NO. PLANTED: \_\_\_\_\_ DATE OF LAST REPORT: \_\_\_\_\_  
 NO. ALIVE AT LAST REPORT: \_\_\_ NO. ALIVE AT PRESENT: \_\_\_

INJURY/LOSS FACTORS: \_\_ DEGREE: \_\_ AVER. PLANT HEIGHT: \_\_\_\_\_ in.  
 (From Record Card) \_\_ (1 = minor to 5 = fatal) AVERAGE PLANT SPREAD: \_\_\_\_\_ in.  
 \_\_  
 \_\_

APPROX. CURRENT YEAR'S SHOOT GROWTH: \_\_\_ cm.

CONDITION OF FOLIAGE: (Circle One) 1 = CLEAN ALL SEASON 2 = SLIGHT DAMAGE  
 3 = UNSIGHTLY DUE TO: \_\_\_\_\_

APPROX. LEAF EMERGENCE DATE: (Circle One) Early Mid Late

APPROX. LEAF DROP DATE: (Circle One) Early Mid Late

FOLIAGE &amp; FALL COLOR COMMENTS: \_\_\_\_\_

	FLOWERS	FRUITS
DATE OF PEAK: ___/___/___	___/___/___	___/___/___
TOTAL DAYS: ___	___	___
NUMBER: ___	___ (1-3) 1 NONE 2 FEW 3 MANY	___ (1-3) 1 DULL 2 AVER 3 SHOWY
EFFECTIVENESS: ___	___	___
NUISANCE: Y N	Y N (Circle One)	Y N (Circle One)

FLOWER AND FRUIT COMMENTS: \_\_\_\_\_

CARE GIVEN PLANTS THIS YEAR: (Circle all that apply)

1 ADDED WATER 3 FERTILIZED 5 FUNGICIDE 7 MOWING  
 2 PRUNING 4 INSECT SPRAY 6 HERBICIDE 8 OTHER \_\_\_\_\_

THESE PLANTS WERE: (Circle One)

1 UNDISTURBED THIS YEAR 2 MOVED TO A NEW SITE 3 DESTROYED, NO LONGER AT TRIAL

IF PLANTS WERE MOVED, RECOVERY FROM TRANSPLANTING: (Circle One)

1 POOR 2 MEDIUM 3 EXCELLENT

SUMMARY OF CURRENT YEAR'S PERFORMANCE: (Circle One) 1 POOR 2 MEDIUM 3 EXCELLENT

DO YOU RECOMMEND THIS PLANT? (YN) \_\_\_ WHY? \_\_\_\_\_

QUALIFICATION TO RECOMMENDATION: \_\_\_\_\_  
 (AESTHETICS & ADAPTATION) \_\_\_\_\_

PLEASE DESCRIBE NOTABLE VARIATION AMONG PLANTS: \_\_\_\_\_

UNUSUAL WEATHER INFO: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

REPORT DATE: \_\_\_/\_\_\_/\_\_\_

PLEASE RETURN BY 15 JUNE 19\_\_ TO:  
 M. P. WIDRLECHNER, HORTICULTURIST  
 REGIONAL PLANT INTRODUCTION STATION  
 IOWA STATE UNIVERSITY  
 AMES, IOWA 50011



NORTH CENTRAL REGIONAL PLANT INTRODUCTION STATION, AMES, IOWA  
NC-7 Regional Ornamental Plant Trials  
Accession Record Card - 10 Year

Family \_\_\_\_\_  
Genus \_\_\_\_\_  
Species \_\_\_\_\_  
Var. \_\_\_\_\_  
CV \_\_\_\_\_

NAME \_\_\_\_\_ State - Site No. \_\_\_\_\_  
Accession # \_\_\_\_\_ P.I. # \_\_\_\_\_ Date Planted Mo. \_\_\_\_\_ Day \_\_\_\_\_ Yr. \_\_\_\_\_  
State \_\_\_\_\_ Location \_\_\_\_\_ Source \_\_\_\_\_

**A. SURVIVAL & INJURY (CONDITION) RECORD**  
(Tally each spring)

Planted Mo. _____ Da. _____ Yr. _____ No. planted	Plants alive (55)	Survival factor numbers (56-58)	Number in- jured (59)	Injury Factor numbers (60-62)
1 yr.				
2 yrs.				
3 yrs.				
4 yrs.				
5 yrs.				
6 yrs.				
7 yrs.				
8 yrs.				
9 yrs.				
10 yrs.				
Percent				

**FACTORS RELATING TO (A) SURVIVAL, INJURY AND (B) PERFORMANCE.** List factors by number and year for survival (56) and injury (60), and by number and plant for Performance at (75.)  
Degree of injury: 1-none; 2-slight; 3-moderate; 4-severe; 5-dead.

- Physical Factors**
- 01 Plant lifted and replanted 1 2 3 4 5
  - 02 Plant destroyed 5
  - 03 Fire Damage 1 2 3 4 5
  - 04 Wind damage--breakage, uprooting 1 2 3 4 5
  - 05 Ice, snow, sleet 1 2 3 4 5
  - 06 Hail 1 2 3 4 5
  - 07 Cultivator, mower injury 1 2 3 4 5
  - 08 Herbicidal injury 1 2 3 4 5
  - 09 Other: 1 2 3 4 5
- Biotic Factors**
- Plants competing for moisture and light with:
- 10 Sod, perennial vines, annuals 1 2 3 4 5
  - 11 Adjacent trees and shrubs 1 2 3 4 5
  - 12 Diseases, trunk cankers 1 2 3 4 5
  - 13 Leaf blights, mildew, rust, spots 1 2 3 4 5
  - 14 Insects, leaf chewing 1 2 3 4 5
  - 15 Leaf mining, sucking 1 2 3 4 5
  - 16 Twig or stem borers 1 2 3 4 5
  - 17 Large animals, browsing 1 2 3 4 5
  - 18 Rubbing, tramping 1 2 3 4 5
  - 19 Rabbits 1 2 3 4 5
  - 20 Jack Rabbit 1 2 3 4 5
  - 21 Mice 1 2 3 4 5
  - 22 Other: 1 2 3 4 5

**B. PERFORMANCE OF INDIVIDUAL PLANTS.** (Measure inspring after 5th and 10th growing seasons or as often as desired)

Years grown	1	2	3	4	Plant #	1	2	3	4	Years grown
1-yr.					63 Height 63					6 yrs.
					66 Spread 66					
2 yrs.					63 Height 63					7 yrs.
					66 Spread 66					
3 yrs.					63 Height 63					8 yrs.
					66 Spread 66					
4 yrs.					63 Height 63					9 yrs.
					66 Spread 66					
5 yrs.					63 Height 63					10 yrs.
					66 Spread 66					
					69 DBH* 69					
					72 Shoot 72					
					growth					
					75 Factor 75					
					numbers					

\*Diam. (Inches) 4 1/2' above ground. Date measured 5th year \_\_\_\_\_ 10th year \_\_\_\_\_  
Plant # \_\_\_\_\_ is superior to other plants of this accession with respect to 1-hardiness, 2-vigor, 3-ornamental qualities, 4-disease or 5-insect tolerance. (Circle numbers). Propagate this for Regional Trial.

- Soil Factors**
- 30 Alkali 1 2 3 4 5
  - 31 Acid soil reaction 1 2 3 4 5
  - 32 Alkaline soil reaction 1 2 3 4 5
  - 33 Erosion 1 2 3 4 5
  - 34 Flooding 1 2 3 4 5
  - 35 Run-off from feed lot 1 2 3 4 5
  - 36 Droughty - sand, gravel 1 2 3 4 5
  - 37 Heavy, sub-soil, poor internal drainage 1 2 3 4 5
- Plants failed to establish**
- 40 Planting made in moisture depleted soil 1 2 3 4 5
  - 41 Planting followed by prolonged drought 1 2 3 4 5
  - 42 Plants inherently difficult to transplant 1 2 3 4 5
  - 43 Plants arrived in poor condition 1 2 3 4 5
  - 44 Plants inferior quality, i.e. small size, no feeder roots, etc. 1 2 3 4 5
  - 45 Other: 1 2 3 4 5
- Delayed Losses and Injuries**
- 50 Prolonged growing season drought 1 2 3 4 5
  - 51 Plant failed to initiate spring growth, following prior year's drought 5
  - 52 Plant failed to leaf out over parts of crown, drought or cold injury 1 2 3 4 5
  - 53 Other: 1 2 3 4 5
- Winter Injury**
- 80 Tips of twigs 1 2 3
  - 81 Confined to one-year wood 1 2 3 4 5
  - 82 To snow line or root crown 2 3 4 5
  - 83 Entire plant killed 5
  - 84 Sunscald on trunk 1 2 3 4
  - 85 Frost cracks 1 2 3 4
  - 86 Evergreen foliage color change 1 2 3
  - 87 Evergreen foliage, damage to leaves and twigs 2 3 4 5

NC-7 RWPT C-1-75

NC-7 Ornamental Plant Trials Accession Report Card

BROOKSIDE GARDENS  
Plant Introductions 1982-1988

DATE	PLANT NAME
1987	<u>Deutzia crenata</u> 'Summer Snow'
1988	<u>Euonymus fortunei radicans</u> 'Harlequin'
1987	<u>Houttuynia cordata</u> 'Chameleon'
1988	<u>Juniperus conferta</u> 'Silver Mist'
1988	<u>Styrax japonicus</u> 'Pink Chimes'
1987	<u>Styrax japonicus</u> 'Carilon'

## Brookside Gardens Evaluation Response Form

EVALUATION RESPONSE FORM  
(for plants sent by Brookside Gardens)REPORTING INSTITUTION:  
REPORTER:  
DATE OF REPORT:COLLECTION NO.: \_\_\_\_\_  
BOTANICAL NAME: \_\_\_\_\_  
NO. RECEIVED: \_\_\_\_\_ DATE RECEIVED: \_\_\_\_/\_\_\_\_/\_\_\_\_ DATE PLANTED: \_\_\_\_/\_\_\_\_/\_\_\_\_  
CURRENT SIZE: \_\_\_\_\_ AMT. OF GROWTH SINCE LAST REPORT: \_\_\_\_\_DID PLANT(S) DIE? \_\_\_\_ Yes; \_\_\_\_ No No. Died: \_\_\_\_  
Suspected reason(s): \_\_\_\_\_  
\_\_\_\_\_

## I. CULTURAL INFORMATION

WHERE PLANTED (describe site): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_SUN EXPOSURE: \_\_\_\_ Shade; \_\_\_\_ Part shade; \_\_\_\_ Sun  
WIND EXPOSURE: \_\_\_\_ Fully exposed; \_\_\_\_ Partly exposed; \_\_\_\_ Sheltered  
DRAINAGE: \_\_\_\_ Sharp; \_\_\_\_ Average; \_\_\_\_ PoorMAINTENANCE GIVEN: \_\_\_\_ Irrigation; \_\_\_\_ Fertilization; \_\_\_\_ Mulch;  
\_\_\_\_ Weed control; \_\_\_\_ Pest control;  
\_\_\_\_ No regular maintenance

Name of chemical(s) used: \_\_\_\_\_

INSECT PESTS: \_\_\_\_ not evident; \_\_\_\_ evident but not severe;  
\_\_\_\_ evident and requiring control; \_\_\_\_ plant(s) killed  
Insect(s), if known: \_\_\_\_\_DISEASE PROBLEMS: \_\_\_\_ not evident; \_\_\_\_ evident but not severe;  
\_\_\_\_ evident and requiring control; \_\_\_\_ plant(s) killed  
Disease(s), if known: \_\_\_\_\_OTHER MAINTENANCE PROBLEMS (e.g., suckers, litter, etc.):  
None: \_\_\_\_ Some problems: \_\_\_\_ Severe problems  
What kind of problem(s)? \_\_\_\_\_  
\_\_\_\_\_SUMMER INJURY:  
HEAT: \_\_\_\_ None; \_\_\_\_ Some damage; \_\_\_\_ Severe damage; \_\_\_\_ Plant(s) killed  
DROUGHT: \_\_\_\_ None; \_\_\_\_ Some damage; \_\_\_\_ Severe damage; \_\_\_\_ Plant(s) killed  
WINTER (COLD) INJURY:  
\_\_\_\_ None; \_\_\_\_ Foliar burn; \_\_\_\_ Tip dieback; \_\_\_\_ Severe branch damage  
\_\_\_\_ Plant(s) killed

## Brookside Gardens Evaluation Response Form - Page 2

ICE OR SNOW BREAKAGE: ☐ Yes; ☐ No; ☐ Not applicable

WIND DAMAGE (BREAKAGE):

☐ None; ☐ Moderate; ☐ Severe; ☐ Not applicable

## II. ORNAMENTAL QUALITIES

## A. FLOWERS

DID PLANT(S) FLOWER? ☐ Yes; No. of plants that flowered: ☐  
☐ No; ☐ Not applicable or not effective  
 If "YES", how heavily? ☐ Sparse; ☐ Moderate; ☐ Abundant  
 Approximate date(s) of flowering: \_\_\_\_\_  
 Describe flowers: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

ORNAMENTAL VALUE: \_\_\_\_\_

(Rate on a scale of 1 to 5 where 1 is "not effective" and 5 is "showy")

## B. FRUIT

DID PLANT(S) FRUIT? ☐ Yes; No. of plants that fruited: ☐  
☐ No; ☐ Not applicable or not effective  
 If "YES", how heavily? ☐ Sparse; ☐ Moderate; ☐ Abundant  
 Date fruits most ornamental (months): \_\_\_\_\_  
 Describe fruits: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

ORNAMENTAL VALUE: \_\_\_\_\_

(Rate on a scale of 1 to 5 where 1 is "not effective" and 5 is "showy")

C. FOLIAGE: ☐ Ornamental; ☐ Ordinary  
 If ornamental, describe: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

ORNAMENTAL VALUE: \_\_\_\_\_

(Rate on a scale of 1 to 5 where 1 is "ordinary" and 5 is "highly ornamental")

FALL COLOR? ☐ Significant; ☐ Not significantIf significant, describe: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## D. OTHER ORNAMENTAL QUALITIES (e.g., form, bark, etc.):

 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

TEXAS AGRICULTURAL EXPERIMENT STATION  
Plant Introductions From 1973

DATE	PLANT NAME
1983	<u>Amorpha fruticosa angustifolia</u> 'Dark Lance'
1983	<u>Chilopsis linearis</u> 'Dark Storm'
1983	<u>Chilopsis linearis</u> 'White Storm'
1981	<u>Leucophyllum candidum</u> 'Silver Cloud'
1983	<u>Leucophyllum candidum</u> 'Thunder Cloud'
1981	<u>Leucophyllum frutescens</u> 'Green Cloud'
1981	<u>Leucophyllum frutescens</u> 'White Cloud'
1983	<u>Leucophyllum minus</u> x <u>Leucophyllum frutescens</u> 'Rain Cloud'
1981	<u>Salvia regia</u> 'Mount Emory'

Arnold Arboretum  
Partial List of Plant Introductions

Acanthopanax sieboldianus 'Variegatus'

Ceanothus x pallidus 'Roseus'

Cedrus deodara 'Shalimar'

Enkianthus perulatus

Forsythia 'Meadowlark'

Heptacodium jasminoides

Indigofera gerardiana

Magnolia biondii

Philadelphus coronarius 'Minature Snowflake'

Pinus nigra 'Arnold Sentinel'

Physocarpus capitatus 'Tilden Park'

Spiraea x cinerea 'Grefshiem'

European Plant Introduction Programs**Clonal Selection Scheme, England**

Address: Institute of Horticulture  
East Mallington  
Nr. Maidstone, Kent  
England

Contact: Dr. Tony Webster

Phone: (0732) 843833

Initiated in 1975 at the Long Ashton Research Station in Bristol, this scheme was reorganized and transferred to East Mallington in Kent, in 1983. The purpose of this program is to upgrade the quality and performance of economically important woody ornamentals in the United Kingdom nursery trade. Clonal selections of specific species or cultivars are tested and compared to identify and select the best correctly named source. Selections are distributed to nurseries and promoted by the members of the Clonal Selection Scheme. A central steering committee, made up of nurserymen, researchers, extension specialists and other experts guide and monitor the program.

**Plant Introduction Scheme, England**

Address: Institute of Horticultural Research  
Littlehampton, West Sussex  
England

Contact: David Whalley

The objective of this scheme is to locate woody ornamental species new to Britain and to assess them for their potential value in the landscape and nursery trade. This program is several years old and has established ties with 32 institutions in Europe, Asia, America and Australia. Plants from these institutions are undergoing preliminary tests at Littlehampton, with emphasis on cold hardiness. Superior plants will be released subject to agreement with the plant breeder or consignor.

**Hardy Amenity Plant Introduction and Evaluation Scheme  
(HAPIE)**

**Address:** The North of Scotland College of Agriculture  
581 King Street  
Aberdeen, AB9 1UD  
Scotland

**Contact:** Mr. A.Q.M. Blain, Secretary, HAPIE Plants

This is a new scheme, which has been modeled after the University of British Columbia Botanical Garden Scheme. HAPIE is organized by nurserymen and staff of the North of Scotland College of Agriculture, the Royal Botanic Gardens, Edinburgh and St. Andrews Botanic Garden. The aim of the program is to identify lesser known herbaceous and woody plants which have merit for the landscape or home garden. Since the program is still in its infancy, selections have not been made.

**Proefstation voor de Boomkwekerij  
(Research Station for Arboriculture)**

**Address:** Proefstation voor de Boomkwekerij  
Valkenburgerlaan 3  
2770 AC Boskoop  
The Netherlands

**Contact:** Mr. J. van Laar

This program, initiated in 1942, receives support from the Royal Boskoop Growers Association. The goal of this program is to collect wild or cultivated plants from local sources or abroad and compare them to standards used in the nursery trade in the Netherlands. Plants are evaluated over a 2-3 year period by a selection committee consisting of growers, plant specialist and the Royal Boskoop Horticultural Society. Superior selections are given awards and announced in a Dutch publication, "Dendroflora."



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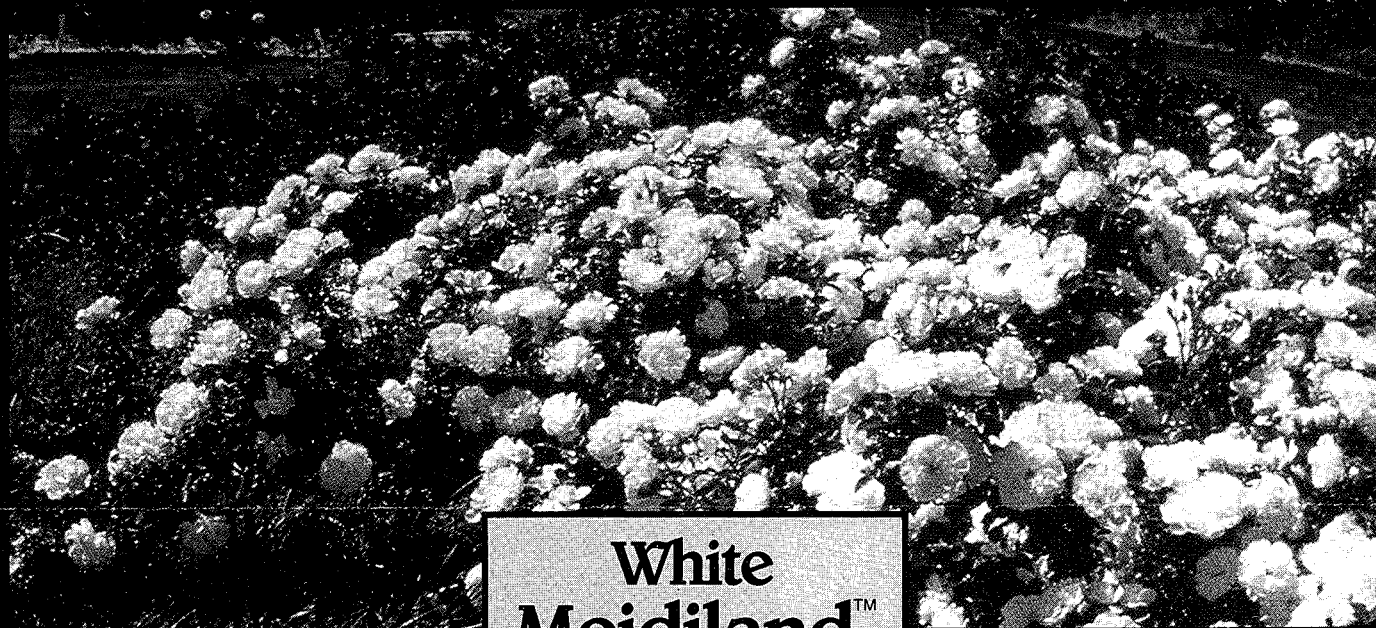
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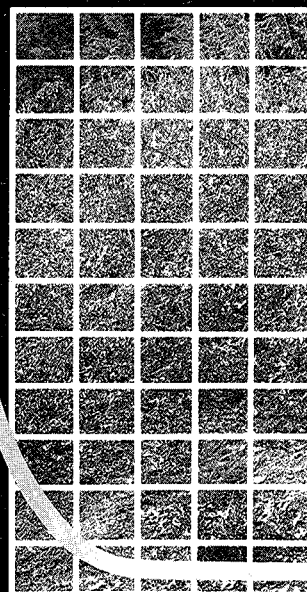
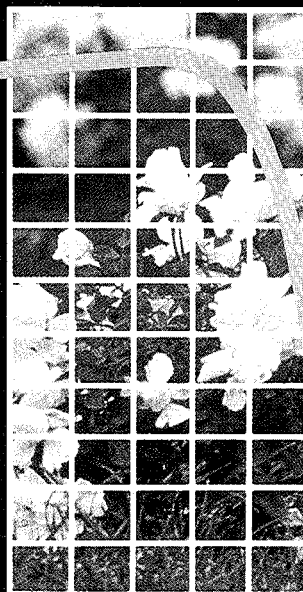
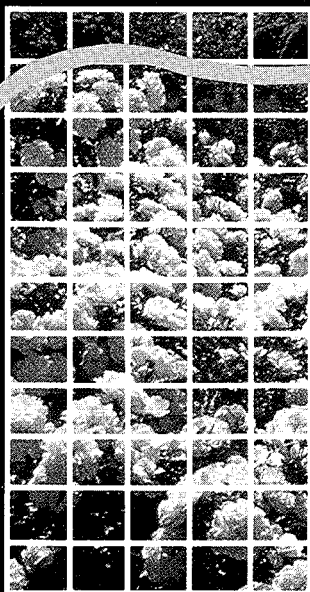
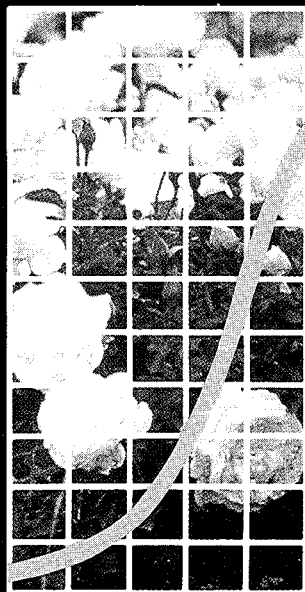
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## White Meidiland™

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**TYPE:** Hybrid Flowering Shrub  
**COLOR:** Sparkling, pure white  
**HARDINESS:** Zone 4b  
**FLOWER:** Very double to 4" across.

**FLOWERING SEASONS:** Everblooming, profuse in June, abundant until frost

**HABIT:** Vigorous, mounding ground cover

**HEIGHT:** 18" to 24"

**SPREAD:** 4'-5'

**FOLIAGE:** Large, leathery, dark, glossy green. Hides the canes

**ORIGINATOR:** Selection Meilland

### SPECIAL FEATURES:

Profuse bloom. Showy, sparkling white blooms set off by heavy, dark attractive foliage. Vigorous.

### USES:

Ideal flowering ground cover. Does well on slopes and banks. Weeps over walls. Foreground cover in front of lawn areas or as lawn substitute. Weed smothering vigor.

### PLANT SPACING:

3 to 4 foot centers in staggered rows.

### MAINTENANCE:

No pruning recommended. Early spring and mid summer fungicide application recommended. Herbicide for first year weed control.

An ideal flowering ground cover with an unusually vigorous, horizontal branching habit. White Meidiland™ features a profusion of sparkling, pure white, bloom. Its very double flowers reach 4 inches across and bloom continuously from late spring to frost. Large, leathery, dark glossy green foliage hides the thick canes very well. White Meidiland™ is ideal for slopes and banks and will weep over walls. It has amazing spread to 5 feet in just two years, but keeps a low, mounding habit.

The Meidiland™ family of hybrid flowering shrubs is especially bred and selected for its added dimension of color, texture, hardiness and minimum maintenance.

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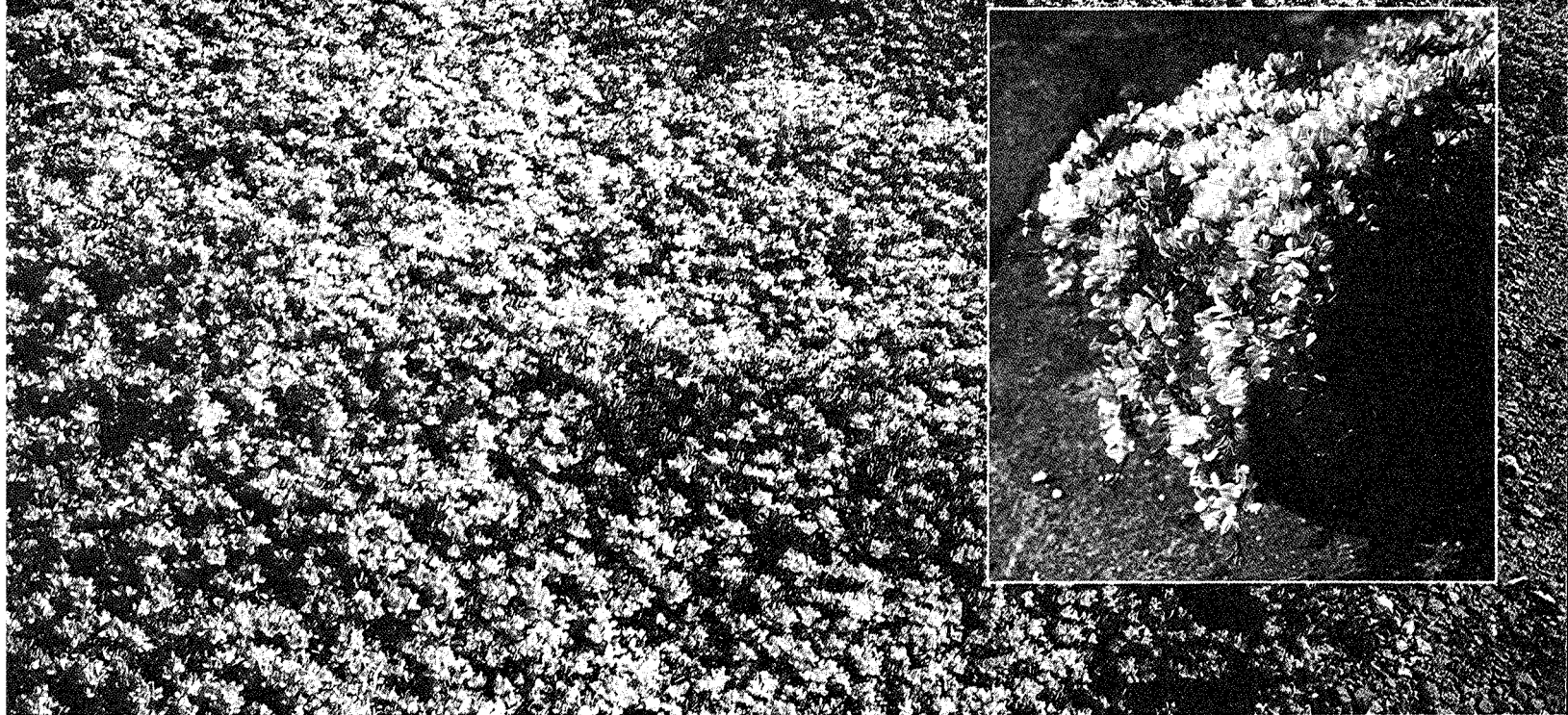
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# The University of British Columbia Botanical Garden

*Presents*

*Genista pilosa* 'Vancouver Gold'  
(B.G.A.S. #12128-117-75)



Produced by the Plant Introduction Scheme of the UBC Botanical Garden in cooperation with the B.C. Nursery Trades Association, the B.C. Society of Landscape Architects and research institution test stations in Canada and the United States. Financial support from the Science Council of B.C. and the Devonian Group of Charitable Foundations.

<b>Botanical Name:</b>	<i>Genista pilosa</i>
<b>Cultivar:</b>	'Vancouver Gold' (a registered COPF cultivar)
<b>Family:</b>	Fabaceae (Leguminosae)
<b>Common Name:</b>	May be called 'Vancouver Gold' broom or spreading broom, but usually referred to by its botanical name, <i>Genista</i> .
<b>Origin:</b>	The wild species occurs from southern Sweden to Greece and in western Europe. It is variable in growth habit in nature. The cultivar 'Vancouver Gold', named by UBC Botanical Garden in 1983, will be introduced to the horticultural trade in 1985. This excellent selection was found and grown by Mr. E.H. Lohbrunner in Victoria, B.C., and was acquired by the UBC Botanical Garden in 1975.
<b>General Description:</b>	<p>A low, spreading evergreen shrub (rooting as it spreads), forming a dense undulating mound of arching grey-green stems and small leaves, covered with bright yellow flowers in May (late April to early June) and a few flowers later in the season.</p> <p>Height: 10-15 cm (4-6 in.); ultimately to about 30 cm (12 in.)</p> <p>Spread: To about a meter (3 ft.)</p> <p>Leaves: Small, bright green above, hairy and grey-green beneath.</p> <p>Flowers: Golden-yellow, pea-shaped to about 1 cm (<math>\frac{3}{8}</math> in.) long, borne in great profusion on the ends of the branches, completely hiding the leaves and stems for about 5-6 weeks.</p>
<b>Soil Requirements:</b>	Average, well-drained soils.
<b>Exposure Requirements:</b>	Prefers a sunny location to look its best. Becomes straggly and flowers less well in shaded positions.
<b>Pruning:</b>	Some shearing or removal of older stems may keep it looking tidy, but its compact form needs no pruning.
<b>Uses in the Landscape:</b>	<p>It is especially well-suited for the average sized garden. It is an excellent evergreen shrub to drift over a rock wall, for a large rock garden, in front of a shrub border or against a wall. It has potential as a container-grown plant for patios and balconies.</p> <p>There is considerable potential for this plant to be used on a large scale as a ground cover for highway berms.</p>
<b>Hardiness:</b>	Completely hardy in Vancouver (U.S.D.A Zone 6A). Probably hardy down to Zone 5.
<b>Propagation:</b>	Semi-hardwood cuttings about 7.5 cm (3 in.) long of multi-branched stems inserted from July to October root 90% + without hormone treatment in 5 weeks. Suitable for direct sticking of cuttings into individual containers.
<b>Sales Potential:</b>	Excellent as a one gallon sales item during late April through May, as it flowers profusely and is very showy.

# PINK LIGHTS ROSY LIGHTS WHITE LIGHTS

The first clones of Northern Lights Azalea Hybrids

Harold Pellett, Robert Mullin,  
Laurie Mainquist, and Susan Moe



Rosy Lights



Pink Lights



White Lights



# PINK LIGHTS ROSY LIGHTS WHITE LIGHTS

The first clones  
of Northern Lights Azalea Hybrids

Harold Pellett, Robert Mullin,  
Laurie Mainquist, and Susan Moe

Pink Lights and Rosy Lights azaleas were selected from hybrids obtained by crossing *Rhododendron x kosteranum* and *Rhododendron prinophyllum*. Availability of these two clones now provides an opportunity to select either a light pink (Pink Lights) or a darker, rosy pink (Rosy Lights) azalea with assurance of uniformity of flower color. Pink Lights and Rosy Lights azaleas mature at 6 to 7 feet in height and spread. They produce a spectacular display of fragrant flowers in late May or early June. Flower buds can withstand winter temperatures of  $-45^{\circ}\text{F}$  without injury.

White Lights resulted from a cross between *R. prinophyllum* and a white flowered Exbury hybrid. Flower buds are pale delicate pink in the balloon stage. Upon initial opening the flowers have a faint pink tinge which fades at full bloom to give virtually a white appearance in the landscape. Flower buds are winter hardy to  $-35^{\circ}\text{F}$ .

Pink Lights, Rosy Lights and White Lights are the first clonal introductions of the hardy Northern Lights hybrid azalea series developed at the University of Minnesota. Future introductions will provide cold-hardy deciduous azaleas with a wide choice of flower color.

Azaleas require an acid soil for best growth. However, they can be grown successfully in soil of neutral pH if an ample amount of acid peat is used for backfilling around the roots and if the plants are fertilized once or twice annually with an acid fertilizer.

Nurseries will have a limited quantity of these plants available for sale in spring of 1984.

The University of Minnesota, including the Agricultural Experiment Station, is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, creed, color, sex, national origin, or handicap





Provide some protection on sand dune plantings. These 2-year-old plants have been protected with cedar shingles since trans-planting.

only container-grown plants. When it is planted on 2-foot centers and well fertilized and mulched, it will provide full ground cover in 2 years.

If you plant 'Emerald Sea' on sand dunes, protect it from wind during the first and second year and add organic matter to the planting hole. See the drawing that shows how to plant shore juniper.

### Propagation

You should take terminal cuttings of 'Emerald Sea' shore juniper during January or early February. The previous season's growth is best for cuttings. They should be one-eighth inch or more in diameter and 5 or 6 inches long. You can keep the material in cool moist storage but it should be used as soon as possible.

The best rooting medium is coarse quartz sand. Soil temperature should be between 70° and 79°F and air temperature between 50° and 59°F. Use an automatic mist system to keep the roots moist and maintain adequate humidity around the top of the cuttings. Shade the rooting bench from direct sun and use a plant hormone to stimulate rapid root growth.

Under these conditions, 'Emerald Sea' cuttings will root adequately for potting within 8 to 12 weeks. The rooted plants can be planted in containers with a mixture of perlite, peat moss, and topsoil. Protect the potted plants until they have adapted to the change and begun to grow again. This usually takes 2 or 3 weeks.

### Availability

For more information on where to buy plants of 'Emerald Sea' and how to use and plant them, contact your local SCS office. It is listed in your telephone directory under U. S. Government, Department of Agriculture, Soil Conservation Service. Assistance is available without regard to race, creed, color, sex, or national origin.



United States Department of Agriculture

Soil Conservation Service  
Program Aid Number 1246

## 'Emerald Sea' shore juniper



# 'Emerald Sea' shore juniper

Shore juniper is well suited for planting on sand dunes near the seashore where other junipers do not grow successfully. It has good salt tolerance and grows well in sandy soils.

'Emerald Sea' is often used for mass or border plantings around buildings and as foreground for taller plant groups. It is also a versatile ground cover plant for steep banks around buildings, parks, and playgrounds.

## Description

'Emerald Sea' shore juniper (*Juniperus conferta*) is a low-growing or trailing evergreen shrub about 1 foot high. Its pale evergreen needles are greenish blue, softer than most junipers, and one-half to 1 inch long. The needles retain their blue-green color very well during the winter, and mass plantings produce a dense and uniform ground cover.

The plant collection that led to the release of 'Emerald Sea' was made in 1967 by the Agricultural Research Service of the U.S. Department of Agriculture. The plants were collected on low coastal sand dunes near Honshu, Japan. Since 1968, this collection has been evaluated in numerous conservation plantings along the mid-Atlantic coast. It was cooperatively released to commercial producers by the Soil Conservation Service and Agricultural Research Service in 1972.

## Suitability

'Emerald Sea' has proved to be winter hardy in areas where the average low temperature is between -10° and 0°F. It is climatically adapted to the coast from Maine to North Carolina, but inland it will grow even farther south. (See the adaptation map.)

Shore juniper grows in medium-fertile soils that are slightly acid and loamy or sandy, and it has good to excellent drought tolerance. It requires well-drained soils and grows best in full sun. For sandy soils in exposed locations like the seashore, 'Emerald Sea' is an excellent plant.

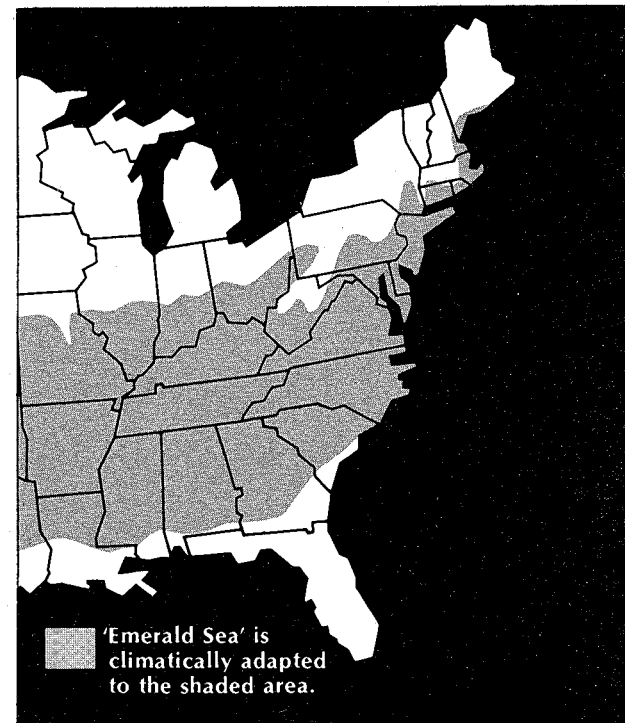
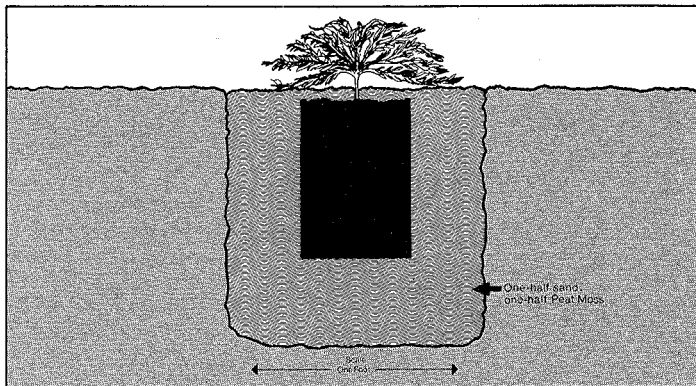
## Establishment

For transplanting, plants that are 1 or 2 years old are desirable. One-year-old stock usually survives better on difficult sites.

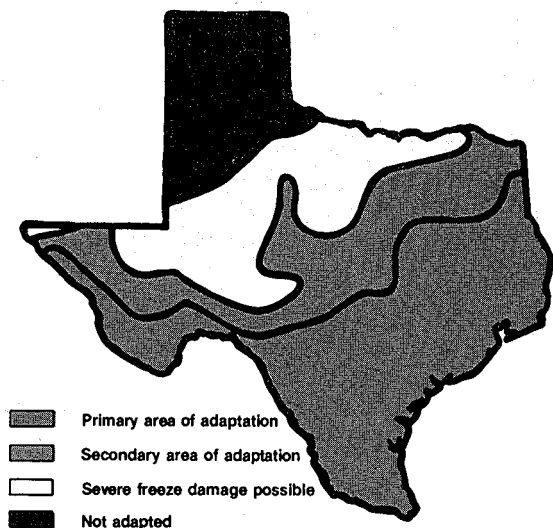
Even though shore juniper is well adapted to harsh sites like the seashore, you must plant it with care. Use



'Emerald Sea' is often used for mass or border plantings around buildings.



'Emerald Sea' spreads well on sandy soils.



Map is an adaptation of USDA Misc. Pub. 814, "Plant Hardiness Zone Map"



## 'GREEN CLOUD'™

Cenizo, Purple Sage, Texas Ranger,  
Texas Silverleaf  
(*Leucophyllum frutescens*)



This leaflet was prepared by B. J. Simpson.

For additional information contact:  
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A Texas A&M Resource Efficient Plant

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# 'Green Cloud'<sup>TM</sup> Cenizo

*Leucophyllum frutescens* (Berl.) I. M. Johnst. (Cenizo, Ceniza, Senisa, Texas Silverleaf, Barometer Bush, Liar Bush, Ash Bush, Texas Ranger, Purple Sage, Texas Rain Sage)

'Green Cloud' Cenizo is among the first of a new race of ornamental plants released to the Texas nursery industry by the Texas Agricultural Experiment Station (TAES). It was selected not only for its beauty and desirability but also because of its low requirements for water, fertilizer, pesticides, and maintenance. 'Green Cloud' is a resource efficient plant when planted in its area of adaptation. It is an attractive pragmatic approach to water and energy conservation in landscape situations, particularly in the arid to semiarid Southwest.

## History and Description

Cenizo (Texas Silverleaf) is native to Texas, growing in the Rio Grande Plains, southern Trans-Pecos, and sparingly in the Edwards Plateau. It is not a true sage but is in the same plant family as the penstemon, snapdragon, and Indian paintbrush. It is found in USDA Plant Hardiness Zones\* 10a, 9a, 9b, 8b, and in 8a as far north as London (Kimble County) where it is most prevalent on south facing slopes of caliche hills. Its energy requirements (water, fertilizer) are low for its area of adaptation. Insects and diseases have not been major problems except for the cotton root rot (Texas root rot) fungus. All cenizos are extremely susceptible to this disease.

'Green Cloud' is a cenizo that reaches 2½ meters (8 ft), but height can be controlled by shearing. Its leaves are green and flowers are relatively large and purple-violet in color.

'Green Cloud' was selected from the wild in Cameron County, Texas in the Rio Grande Plains by the son of N. P. Maxwell of the Texas Agricultural Experiment Station at Weslaco. It was selected for the dark green of its leaves as well as its first-rate purple-violet flowers. 'Green Cloud' was tested at TAES-Dallas and Weslaco as selection TAES 105LF and is cutting propagated.

## Area of Adaptation

'Green Cloud's primary adaptation is to Zones 10a, 9a, 9b, and 8b where generally there is little damage from freeze. While widely planted in Zones 8a and 7b, 'Green Cloud' faces the possibility of some freeze damage in these areas.

'Green Cloud' is adapted to alkaline, well-draining soils of the arid to semiarid areas of Texas and the Southwest.

## Cultural Care

'Green Cloud' should be planted in full sun, with excellent drainage and a source of free calcium. If planted in acid soils, agricultural or dolomitic limestone should be added to adjust pH to alkaline range. If supplemental calcium is needed in western areas, gypsum is more appropriate as a soil amendment prior to planting. High rainfall areas or poorly drained soils require the planting area to be raised for better drainage.

'Green Cloud' should be treated as any other plant during the first year of establishment. Little care is required after the initial year of growth. Deep, periodic waterings are beneficial. Added soil fertility usually is not necessary.

When grown outdoors, 'Green Cloud' is capable of multiple flowering periods following rains and/or periods of high humidity, although there is usually only one major display in late August — early September.

All cenizos respond well to shearing, which may be necessary to "tighten" a leggy plant. Growers, however, may prefer the natural growth habit of the plant. Ideal shearing time is early spring prior to new growth. Shearing also may be done later in the year, but not in late fall because tender, new growth may freeze.

\*Plant Hardiness Zone Map, USDA Misc. Pub. No. 814, a map which shows the "Approximate Range of Average Annual Minimum Temperatures" for the United States. The higher the zone number, the warmer the annual average minimum temperature. Thus, for 'Green Cloud':

### Primary Areas of Adaptation

- Zone 10a = 35° - 30° F
- 9b = 30° - 25° F
- 9a = 25° - 20° F
- 8b = 20° - 15° F

### Secondary Area of Adaptation

- Zone 8a = 15° - 10° F

### Severe Freeze Damage Possible

- Zone 7b = 10° - 5° F