

INTRODUCING NEW AND RECOMMENDED PLANTS INTO THE NURSERY INDUSTRY OF BRITISH COLUMBIA

BRUCE MACDONALD¹

UBC Botanical Garden
6501 North West Marine Drive
Vancouver, British Columbia V6T 1W5 Canada

The Plant Introduction Scheme at the University of British Columbia Botanical Garden (P.I.S.B.G.) was initiated in 1980 by the Garden's past Director, Dr. Roy L. Taylor. The aims and procedures of the program to introduce plants into the nursery and the role of the eleven test sites across North America, have been previously documented in the IPPS Proceedings (1, 2). The purpose of this paper is to summarize the progress to date, review some of the ongoing work, relate our plans to develop an endowment foundation for the program, and conclude with a tabulated appendix (see end of paper) on the best to-date methods for propagation of these plants.

The cooperation between the UBG Botanical Garden (hereafter referred to as Garden) and the nursery and landscape industries has been the major factor in the program's success. Currently, there are some 26 participator nurseries in British Columbia and well over 1,500,000 plants have been produced from the first six public releases—*Arctostaphylos uva-ursi* 'Vancouver Jade', *Genista pilosa* 'Vancouver Gold', *Microbiota decussata* (UBC Clone # 12701), *Viburnum plicatum* 'Summer Snowflake', *Rubus calycinoides* 'Emerald Carpet' and *Anagallis monelli* 'Pacific Blue'. In addition to sales in Canada, these plants have been exported to the United States, Britain, Denmark, Holland, France, Korea, and Japan. Another important factor to assist sales has been publicity, for example, the fact sheets produced by the Garden. Each fact sheet has a color picture of the plant on the front, with information on the reverse side regarding landscape use, hardiness, propagation, and other relevant points on culture.

Clonal selection and breeding. Clonal selection of native plants is an important aspect of the P.I.S.B.G. program. It is well known that many native species show considerable genetic variation in the wild. Traditionally, nurserymen have collected their material in the wild for vegetative propagation. Propagation from wild stock subsequently leads to considerable variation in rooting potential, habit, leaf and flower color and, in some cases, tolerance to disease. These factors often lead to a considerable variation in crop quality. Clonal selection can be illustrated by the following examples.

¹ Director

1) *Arctostaphylos uva-ursi* (kinnikinnick or bearberry). This ground cover is used heavily by the landscape industries in the Pacific Northwest. Much variation exists in native plants and there was a real need for an improved local selection. The plant finally chosen was one that the late Mr. E. H. Lohbrunner selected from his own plants some years ago. The Garden registered it with the Canadian Ornamental Plant Foundation (COPF) and introduced it as *A. uva-ursi* 'Vancouver Jade'. It is vigorous, spreads uniformly, has bright green foliage that takes on plum-purple colorations in the winter, carries fragrant clusters of pink flowers well above the foliage in early spring, is more resistant to pathogens affecting the leaves and young shoots, roots with over a 90% success rate, and produces a quality container product.

2) *Vaccinium ovatum* (evergreen huckleberry). This plant shows considerable variability in growth habit, leaf shape, and stem and leaf color—particularly in the degree of red pigmentation in the new growth in spring. The selected plant has abundant flowering and particularly good reddish-bronze new growth. It is currently being multiplied to provide mother plants to send to the participator nurseries in 1989.

3) *Paxistima myrsinites* (Oregon boxwood). There has been a particular interest in this plant from the landscape and highway department for planting in the dryer interior areas of our Province. Again, there is considerable variation in habit and leaf size when using plants propagated from wild collections. The plant finally selected and named *P. myrsinites* 'Emerald Cascade' was from wild collections made by the Garden's Native Garden Curator, Al Rose. The new growth is bright green, and has a very appealing weeping habit. Initial trials at our nursery showed that the plants were susceptible to *Pythium* and *Phytophthora* root rot with overhead irrigation systems used on the coast. This resulted in our withholding the plant from introduction to the participator nurseries. However, further trials and observations at two commercial nurseries lead us to believe that this plant will be introduced within the next 2 to 3 years.

About 31 members of the evaluation panel met in July to review the collections established at the Garden's nursery for potential introduction. This resulted in five plants being selected for possible distribution to participator nurseries.

The Garden's Research Scientist, Dr. Gerald B. Straley, has continued his breeding research work with *Alstroemeria*, *Meconopsis*, *Phygelius*, and *Schizostylis*. In *Alstroemeria* he is using mainly the species *A. haemantha* for compactness, *A. aurantiaca* for hardiness, and the Ligtu hybrids for their range of color, to create hybrids that will enable this genus to be more widely used in gardens. He is using the Garden's *Meconopsis* collections to isolate plants of the very attractive blue *Meconopsis betonicifolia* which

are demonstrating potential true perennial characteristics. An interesting color range is developing from crossing the red-flowered *Phygelius capensis* with the pale yellow *P. aqualis* 'Yellow Trumpet'. The first generation hybrids have been crossed back with the two parents. The attractive red-flowered *Schizostylis coccinea* has performed particularly well as a late-season garden plant in Vancouver. A limited range of hybrids with flowers of pale pink to bright red hues are available in the trade from some specialist nurseries. Dr. Straley's goals are to create hybrids which have shorter stems, flower earlier so that petals do not deteriorate so rapidly in the seasonal heavy rains in this area, and to produce a white-flowered cultivar.

Future releases. Our experiences have shown that only two or three plants should be introduced in any one year if each plant is to become well-known and accepted by the nursery and landscape industries. However, it is appreciated that this goal may vary according to the aims and development of plant introduction programs from other institutions.

One new plant to be released in March, 1988, is an attractive, white-flowering form of the native *Ribes sanguineum* with the cultivar name 'White Icicle'. It is thought to have originated in Victoria, B.C. 'White Icicle' grows to about 10 ft (3.0 m) in height and 7 ft (2.0 m) in width, with flower racemes that are 4–5 in. (10–13 cm) in length. It is very effective in mass landscape plantings, particularly when mixed with the red forms for contrast. It should be hardy to USDA Zone 6/Canada Zone 6b–7a. This cultivar is registered with the Canadian Ornamental Plant Foundation.

Two other plants to be publicly released in March, 1988, are not new plants but two perennials which, in our experience, should be made much more available in British Columbia and perhaps other areas of North America. They can sometimes be found listed in specialist plant nurseries in North America and Europe. The first is *Diascia rigescens* (twinspur or bride's saddle), a native of South Africa that flowers intensively through the summer months. Its growth habit and bright pink flowers make it desirable for bedding, patio and container uses. The spent flowering shoots should be removed to encourage further flowering. It is hardy to USDA Zone 7/Canada Zone 7b–8a, and should be treated in cold areas as an annual and propagated each year from plants overwintered in a greenhouse.

The second perennial is the little-known *Teucrium scorodonia* 'Crispum' (crispy wood sage). The species is native to Europe and has become naturalized in Eastern North America. The plant grows to 18 in. (45 cm) in height and is unique because of the attractive ruffled margin to the lime-green leaves. The foliage texture has good retail potential for use in mixed plantings of annuals and perennials, hanging baskets and other containers. Frequent

shearing promotes vigorous new growth, especially when being grown for its foliage. It should be hardy to USDA Zone 5 or 6/Canada Zone 5b-7a.

There are currently nine plants that are being developed and researched to ascertain the correct production schedules before being distributed to the participator nurseries. It is important that the continuity of the program be ensured by always having plants in the system at various stages of evaluation and testing, ready for subsequent introduction. Conversely, it is just as important to discard plants that have not attained the program's objectives before they are released into commercial production.

Future funding—establishment of the Henry M. Eddie Plant Development Foundation. Matching funding for the program was obtained initially through grants from the Science Council of British Columbia and the Devonian Group of Charitable Foundations in Calgary. Additional income has been received by the payment of royalties through the Canadian Ornamental Plant Foundation and from the sale of mother plants and unrooted cuttings. This income from the first six releases now amounts to over \$70,000.

What has been particularly rewarding is that an independent economist, hired by the Science Council of British Columbia to evaluate the direct economic benefit to industry from their different programs, reported the following about the P.I.S.B.G. program: “. . . sales in 1985 were just under \$600,000. The administrators of the program were surprised to find that a significant portion of those sales were to buyers in the Eastern United States and Western Europe. Estimates for 1986 are for sales of \$1.2 million, and in 1987, \$1.9 million”.

The two initial grants have completed their terms and the P.I.S.B.G. program now has to be self-financing. Currently, the funds generated from the royalty income are not sufficient to fully support the program. Following discussions with the Garden, the nursery industry proposed the formation of an endowment program to ensure long-term support.

The foundation has been named the Henry M. Eddie Plant Development Foundation. Henry M. Eddie, born in Scotland, was one of British Columbia's most important pioneer nurserymen. Besides his expertise as a nurseryman, he achieved international acclaim for his breeding of roses, fruit trees, and dogwoods. His most renowned hybrid was the result of a cross made in the 1940's between *Cornus nuttallii* and *C. florida*, subsequently named *C. 'Eddie's White Wonder'*.

A ten-member Board will be appointed, half of whom will represent the nursery industry. The terms of reference for this Board will be essentially three-fold:

- 1) Advise the Garden on potential sources of funding from government, industry, and private sources; assist the

Garden in achieving donations from such sources; and ensure the Garden is maximizing sources of revenue from plant sales, e.g., royalties and trademarks.

- 2) Oversee the administration of funds received and their utilization at the Botanical Garden for the purposes intended.
- 3) Undertake to canvass potential donors and keep the nursery industry and others aware of the work of the P.I.S.B.G., the Gardens, and other University facilities.

The revenue received from royalties and the foundation will be used largely to:

- 1) Introduce new and recommended plants from the Garden's collections into the commercial nursery trade.
- 2) Provide increased revenue to the British Columbia nursery industry for provincial, national, and particularly, export sales.
- 3) Establish breeding programs of hardy woody and perennial plants using the Garden's collections.
- 4) Proceed with the clonal selection of native and existing commercial plants to improve the current genetical material.
- 5) Encourage international field collections to ensure wild collected material continues to improve the Garden's collections.
- 6) To develop new technology for the establishment of new plant material.

CONCLUSIONS

We have all learned a great deal from both our successes and mistakes. The program has been of direct financial benefit to the industry and the Garden. We have been very encouraged by the help and interest given to us from across Canada, North America, and some European countries. It has also been rewarding to see that some other gardens and institutions have adapted the P.I.S.B.G. program to suit their own requirements—for example, the Royal Botanical Gardens, Hamilton, Ontario, the Chicago Botanic Garden, Glencoe, Illinois, and the North of Scotland College of Agriculture, Aberdeen. There is also considerable interest in starting similar programs in Australia, New Zealand, and South Africa. Through effective communication and cooperation with the nursery and landscape industries, plant introduction programs allow botanical gardens to show considerable leadership and help to ensure that plants from their collections are made available to beautify home and public landscapes.

LITERATURE CITED

1. Macdonald, A. B., 1985. A plant introduction scheme for new and recommended plants from British Columbia, Canada. *Proc. Inter. Plant Prop. Soc.* 35:411–417.
2. Taylor, R. L., University of British Columbia Garden Plant Introduction Scheme—an opportunity for a new relationship between nurseries and the public garden. *Proc. Inter. Plant Prop. Soc.* 33:121–125.

APPENDIX

A tabulated guide to the methods used to propagate P.I.S.B.G. introductions from the University of British Columbia Botanical Garden

Species/cultivar	Method of propagation	Comments
<i>Anagallis monelli</i> 'Pacific Blue'	Softwood cuttings from March through to April. Can commence February from stock plants overwintered in a greenhouse. Rooting hormone not necessary. Growing tips of cuttings should be removed.	Tend to deteriorate if not removed from propagation facility following rooting. Rooting medium must be well-drained. Consider using 2:1 ratio of perlite and peat.
<i>Arctostaphylos uva-ursi</i> 'Vancouver Jade'	Semi-riewood/evergreen hardwood heel or nodal cuttings from July to January, using a rooting hormone of 0.8% IBA in talc. Benefits gained by wounding cuttings taken November to January	Some propagators in B.C. have had inconsistent results in July and August. Rooting success rates over 90% achieved October–January. Must avoid excessive misting in fall and winter, otherwise cuttings prone to fungal infections.
<i>Diascia rigescens</i>	Softwood cuttings April to early September. Rooting hormone not normally required; use 0.1% IBA in talc, if necessary	Rooted cuttings and liners are prone to <i>Botrytis cinerea</i> (gray mold) infection, particularly in late winter and early spring. Regular sprays at 2–3 week intervals are recommended, alternating glycofene (Rovral®) with benomyl (Benlate®) in areas where this problem occurs.

- Note:
- (i) Standard rooting medium: perlite:peat moss (2:1, v/v) with basal temperature 65 to 70°F (18–21°C)
 - (ii) Propagation facility—mist, fog, or plastic film with the latter particularly for late fall and winter sticking
 - (iii) All plants lend themselves to direct sticking in liner pots except, in some instances, *Anagallis monelli* 'Pacific Blue'

Species/cultivar	Method of propagation	Comments
<i>Genista pilosa</i> 'Vancouver Gold'	Multi-branched semi-hardwood cuttings 3–4" (7.5–10 cm) in length during July to November. Rooting hormone during summer is not necessary, but 0.5–0.8% is beneficial for fall rooting.	Lends itself to rooting in cold frames.
<i>Microbiota decussata</i> (UBC Clone # 12701)	Root as semi-ripenwood/evergreen hardwood cuttings from August–January with at least 1" (2.5 cm) of the previous year's wood included at the base. Rooting hormone of 0.8% IBA in talc or 0.25% IBA solution is advised, particularly for winter sticking.	Experience in B.C. has shown that a variable percentage of plants die following over-watering in containers, but no pathogen found. Over-wintering outdoors in high rainfall areas seems to encourage this condition. Stock plants showing gray/green fading of foliage must be discarded.
<i>Teucrium scorodonia</i> 'Crispum'	Easily rooted from softwood and semi-ripenwood cuttings from March to October. Rooting hormone not necessary, but 0.1–0.3% IBA in talc can be helpful for late summer and fall rooting.	
<i>Ribes sanguineum</i> 'White Icicle'	Softwood or semi-ripenwood nodal cuttings 4" (10 cm) in length. Alternatively, root as dormant leafless hardwood cuttings in late fall-early winter, applying 0.8% IBA in talc or 0.1% IBA in solution.	Over-wintering problems can occur if semi-ripenwood cuttings are rooted later than late summer.
<i>Rubus claycinoides</i> 'Emerald Carpet'	Can be rooted virtually year-round from softwood and semi-ripenwood cuttings. No rooting hormone necessary.	In cold and exposed areas, the stock plants should be protected during winter months.
<i>Viburnum plicatum</i> 'Summer Snowflake'	Nodal softwood cuttings 3–4" (7.5–10 cm) from June–August, using a rooting hormone of 0.3–0.5% IBA in talc. Due to the length of internodes, it is often easier to prepare a single nodal cutting with a pair of opposite buds (the	Care is required when over-wintering—cuttings should not be stuck later than mid-August and the rooting medium must be kept relatively dry. All leaves should be removed at leaf fall to

Species/cultivar	Method of propagation	Comments
	stem is cut internodally at the appropriate length).	reduce the risk of fungal infection. Consider removing flower buds of liners in early spring to encourage vegetative growth. Rooting period can be extended by taking cuttings in April from stock plants sited in a greenhouse—flower buds should be removed.

DOVE TREE (*DAVIDIA INVOLUCRATA* VAR. *VILMORINIANA*) AND ITS PROPAGATION BY SEEDS

ALFRED J. FORDHAM

898 Clapboardtree Street
Westwood, Massachusetts 02062

Davidia, one of the most unusual trees growing in the Arnold Arboretum, Jamaica Plain, Massachusetts, was introduced to horticulture from China. Abbe Armand David, a French missionary, discovered it while botanizing in the mountains west of Szechuan, China, and sent specimens to Paris, France, where it was described and named after him. Credit for its introduction to horticulture, however, goes to Pere Farges, another missionary who in 1897 sent 37 nuts to the Vilmorin Arboretum at Les Barres in France. From this shipment one seedling germinated in 1899. Two cuttings and one layer were propagated from it. The cuttings were provided to botanical institutions in Europe; the rooted layer was sent to the Arnold Arboretum in 1904 and there it still grows. This particular strain was determined to be different enough from the species to warrant a varietal name and therefore became *Davidia involucrata* var. *vilmoriniana*.

In Rehder's *Manual of Cultivated Trees and Shrubs*, *Davidia involucrata* is listed as being hardy in Zone 6 (−5° to +5°F) while the variety *vilmoriniana* is rated as being hardy in Zone 5 (−10° to −5°F). During the winter of 1933–34 *D. involucrata* var. *vilmoriniana* was killed to the ground at the Arnold Arboretum, but sprouted from the roots and is now a tree with six trunks. It should be noted that the winter of 1933–34 had some of the lowest temperatures ever recorded in the northeastern United States. On rare occasions the