

Starting a Nursery Business in BC 2nd edition



Starting a Nursery Business in BC (2nd edition)

INTRODUCTION TO STARTING A NURSERY

A nursery business offers the opportunity for a financially and personally rewarding business venture for the dedicated owner who has a sound business plan. The industry is attractive to new growers due to the small land base and minimal capital investment required to start a nursery; however, a wide range of knowledge is required and, there are many things to be considered before investing in a nursery operation.

This booklet is intended to assist a new grower in making the decision of whether or not to enter the nursery industry. The publication gives an overview of the industry, discusses points that should be considered before starting a nursery, and offers other valuable sources of information.

OVERVIEW OF THE NURSERY INDUSTRY

THE BC NURSERY INDUSTRY

BC is the second largest producer of nursery stock in Canada and accounts for 31% of the national nursery trade¹. The major production areas are concentrated on Vancouver Island, and in the Kootenay, Lower Mainland, and Okanagan regions. These areas enjoy some of the lowest production costs in Canada because of minimal over-wintering requirements, maximum growing season length, and the availability of abundant supplies of good-quality water.

BC nursery businesses range in size from small, one-person operations to highly mechanized facilities with numerous full time and seasonal staff and several hundred acres of field stock, outdoor container beds, and/or greenhouse facilities. Container production is more prevalent as more intensive crop production per acre is possible than with field production. Some nursery businesses are entirely wholesale grower operations, while others may specialize in the retail market, or have both retail and wholesale divisions.

Nursery crops include a diverse range of several thousand genera of ornamental plants. They range from herbaceous garden flowers, vines and grasses, to woody trees and shrubs, both deciduous and coniferous. Growers may propagate their plants from stock plant material or purchase "liners" from other nurseries to grow on and resell.

Table 1. Industry Challenges

- Marketing** - There are no marketing boards or other central sales agencies to assist producers to sell their crops.
- Supply and demand** - Since it takes years to grow many crops, crop demand can change faster than a grower's ability to adapt.
- High land values** - The main nursery production areas have some of the highest land costs in the province.
- Labour shortage** - The industry has a shortage of unskilled and skilled workers.
- Fewer pest controls** - There is a lack of ornamental pesticide registrations in Canada. Growers must place more emphasis on integrated pest management.
- Lack of local research** - Research at public institutions is focused on food crops. Nurseries must fund their own research, work with the BC Landscape and Nursery Association, or access research from other regions.

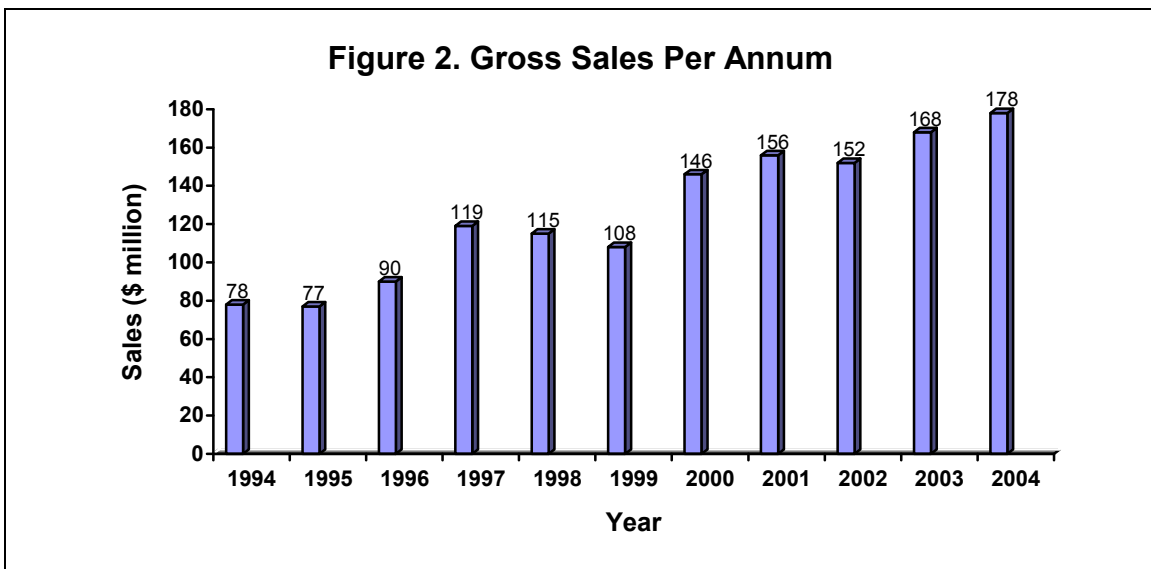
¹ *Greenhouse, Sod and Nursery Industry*. 2004. Statistics Canada, cat. # 22-202-X1B

Figure 1. Hoop houses at a large container nursery in BC.



The main purchasers of BC nursery products are: garden centres (21%), other growers (13%), landscape contractors (15%), mass merchandisers (9%) and retail sales to the public (10%)². A large proportion of BC nursery products are exported.

The BC nursery industry has experienced steady growth since 1992 in both sales (Figure 2) and acreage under production (Figure 3). Sales have grown from \$78 million in 1994 to \$178 million in 2004, an increase of 127% over the ten years³. Land area under nursery production in the province increased by 87% between 1993 and 2003. BC nursery export sales reached \$71 million. Export sales increased rapidly between 1998 and 2002, showing a 122% growth rate, by far the largest percentage increase of any province⁴ (see Figure 4).



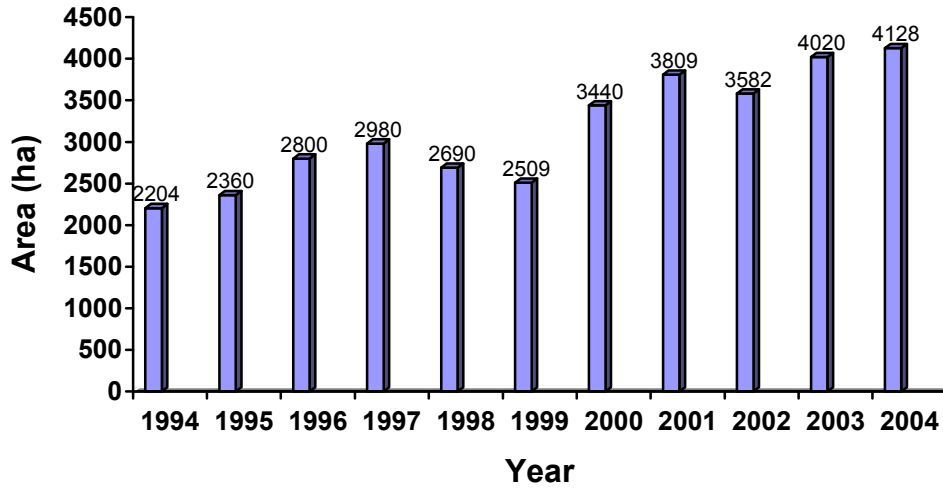
Source: Statistics Canada, Farm Income Section, Agriculture Division

² *Greenhouse, Sod and Nursery Industry*. 2004. Statistics Canada, cat. # 22-202-X1B

³ *Greenhouse, Sod and Nursery Industry*. 2004. Statistics Canada, cat. # 22-202-X1B

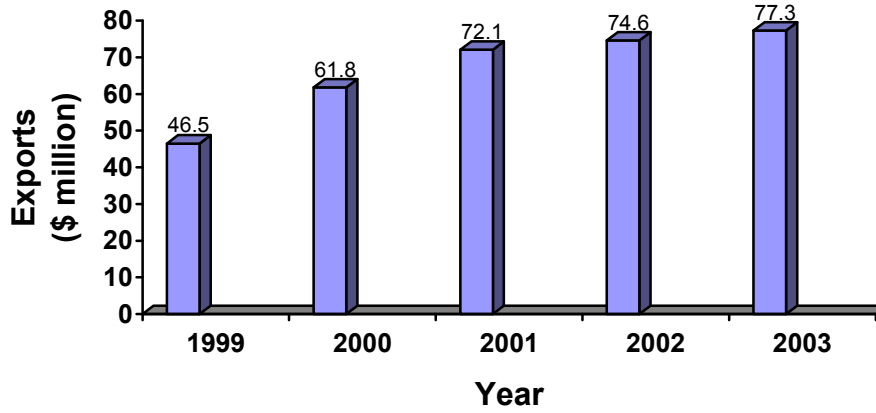
⁴ Statistics Canada. Available online at: [Trade Data Online](#)

Figure 3. Nursery Land Area (nurseries of 2 ha or more)



Source: Statistics Canada, Catalogue 22-202

Figure 4. BC Exports of Live Plants to the U.S.



Source: Trade Data Online

THE CANADIAN NURSERY INDUSTRY

The Canadian nursery industry has seen significant increases in sales over the past several years, despite a decline in nursery area across the nation⁵. In 2004, nursery sales in Canada were Cdn\$568.9 million, a 5% increase over the previous year. Nursery land area decreased by 1.0% over the previous year, to 46,836 hectares (115,735 acres). A trend in the industry is increased imports and purchases for resale by nurseries, and a decline in purchases for growing⁶.

The main nursery areas in Canada are Ontario, which accounts for 46% of total sales, and British Columbia, with 31%⁷. Quebec ranks third, representing 12% of national nursery sales.

The market for Canadian nursery stock is diverse; it encompasses wholesale, retail and export sales. Nationally, the three major markets in Canada are garden centres (22%), landscapers (23%) and sales to the public (14%)⁸. Mass merchandisers continue to be an important and growing market for nursery stock. In 2004, nursery growers sold more than 12% of their product to mass merchandisers, which was up from 7% in 2000⁹.

The export market for nursery products is strong. Canada's primary trading partner in the nursery industry is the US. Canadian nursery products account for almost 50% of all nursery imports into the US, with a value of close to US\$293 million in 2001¹⁰. The US is the world's largest consumer and producer of nursery products⁵; and has the potential to be a lucrative and growing market for Canadian nursery products. Canada's proximity to the US and a currency exchange advantage placed Canadian nursery growers in a strong position to take advantage of this opportunity in the mid 1990's. This advantage has eroded in recent years as the value of the Canadian dollar has soared to 10-year highs. The Canada-US exchange rate was 0.635 to begin 2003, but had risen to 0.775 a year later. The dollar has continued to strengthen into 2006. It is no secret that a high exchange rate influences the ability of Canadian exporters to access the US market.

"The total value of product exported to the US represents a significant portion of Canada's total farmgate sales, however, they are a mere drop in the bucket compared to what is consumed annually by the American marketplace. There exists a huge potential for increased market share.

Then too, there is always the possibility that at some time in the future, a strengthened Canadian dollar will remove our price advantage."¹¹

Canada is a net exporter of nursery and tree products¹². In 2002, exports totaled Cdn\$417 million, nearly twice the value of imports, which were Cdn\$210 million. Table 2 examines the distribution of exports by province; Ontario is the primary exporting province, accounting for 62% of the total. BC is the second largest exporter, followed by Quebec. Together, these three provinces represent 90% of Canadian nursery exports.

⁵ *Greenhouse, Sod and Nursery Industry*. 2004. Statistics Canada, cat. # 22-202-X1B

⁶ *Greenhouse, Sod and Nursery Industry*. 2004. Statistics Canada, cat. # 22-202-X1B

⁷ *Greenhouse, Sod and Nursery Industry*. 2004. Statistics Canada, cat. # 22-202-X1B

⁸ *Greenhouse, Sod and Nursery Industry*. 2004. Statistics Canada, cat. # 22-202-X1B

⁹ *Greenhouse, Sod and Nursery Industry*. 2004. Statistics Canada, cat. # 22-202-X1B

¹⁰ *The US Market for Floriculture and Environmental Horticulture*. June 2000. Jeremy Finkelstein. Agriculture and Agri-Food Canada. [Available online](#)

¹¹ *Quality standards program will improve both export and domestic sales*, National Grower News, Spring 2003, vol. 1, issue 1, Canadian Nursery Landscape Association

¹² Statistics Canada. Available online at: [Trade Data Online](#).

Table 2. Growth of Canadian Nursery Exports (Cdn\$,000) 1998-2002

	1998	1999	2000	2001	2002	% Increase 1998-2002
Ontario	176,598	192,043	221,871	251,871	258,591	46%
British Columbia	32,202	44,102	58,542	69,790	71,356	122%
Quebec	28,491	30,207	32,549	39,014	43,770	54%
New Brunswick	20,109	23,010	21,311	24,982	25,877	29%
Nova Scotia	14,012	12,863	13,060	14,965	15,013	7%
PEI	881	892	1,050	1,019	1,164	32%
Manitoba	523	793	749	1,064	746	43%
Alberta	1,459	279	497	415	423	-71%
Saskatchewan	152	31	87	174	83	-45%
Total	274,427	304,237	349,114	403,295	417,023	52%

Source: Statistics Canada (Trade Data Online)

Table 3. Industry Opportunities and Strengths

<p>Climate – The Lower Mainland and Vancouver Island areas have some of the mildest climates in Canada.</p> <p>Industry grading standard - The <i>BC Landscape Standard</i> is improving consistency of product quality which, in turn, relates to industry integrity and strengthens local and export sales.</p> <p>Co-operation between growers - Growers work together to solve production issues.</p> <p>Freedom from quarantine pests - Permits freer access to markets throughout North America for BC nursery stock.</p> <p>Support and representation from industry associations - Provincial and federal associations address issues and problems faced by nursery growers. Industry associations also foster high standards and communication between members.</p> <p>New technology - Increases marketing opportunities, and aids in production efficiency and information storage. Automated systems are available to reduce production costs and labour requirements, and to allow more efficient use of resources.</p> <p>Increasing demand - Sales of nursery crops are increasing steadily. “Americans are gardening more than ever before, and they will continue to garden more in the future ¹³.” Predictions of continued growth in gardening are good news for the industry.</p> <p>Pacific Rim trade - The nursery industries in Oregon and Washington are interested in the prospects of markets in Asia and have sent several trade missions to China and Japan in recent years. There may be opportunities for BC as well.</p> <p>New plant cultivars - New crops are being continually introduced and offer potential for higher returns than standard industry cultivars.</p>
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¹³ K. Druse, “Fulfilling Dreams.” *American Nurseryman*, April 1, 1998.

CONSIDERATIONS FOR NEW NURSERY GROWERS

There are many points to consider when looking to start a nursery, such as:

- personal aptitude,
- crop marketing,
- site selection,
- site design and layout,
- developing a business plan, and
- crop selection.

PERSONAL APTITUDE

Becoming a successful nursery operator requires more than a love for gardening. To be successful, a nursery operator must possess a high level of commitment and have a broad range of skills. In order to reduce expenses, it is beneficial for the operator to be able to perform all, or most, of the work required in the day-to-day operation of the business. The skills required to operate a nursery include:

- technical trade skills, such as plumbing, electrical, carpentry, welding, and mechanics;
- knowledge in crop production, including plant growth and development, soils, plant nutrition, and pest management;
- business skills, such as record keeping, inventory control, business and personnel management, marketing, and accounting; and
- the ability to cope with adversity is invaluable, since adversity is inevitable. Adversity will arise in the form of weather or pest-related crop problems, equipment breakdowns, staff problems, and poor sales and cash flow.

The more of these skills an operator has, the better his/her chance of success. However, do not be discouraged if you do not possess all the skills listed, since they can be learned from courses offered by local educational institutions. Information about post-secondary programs in BC is available at the [Education Planner website](#). There are numerous 1-day nursery seminars offered during the year that may be of particular interest to new growers. Information about these industry events is available on the [BC Landscape and Nursery Association](#) (BCLNA) and the [InfoBasket](#) websites.

The Canadian Agriculture Skills Service became operational in BC in the fall of 2005. The program provides assistance for training in both farm and off-farm skills. The types of training that are eligible include college programs, and short courses and field days. The process involves 3 steps, including skills assessment, development of an individual learning plan, and training. The program is delivered through Service Canada and is available to farmers and their spouses. Eligibility and benefits are based on family income. For more information about the program, contact Service Canada at: 1-800 O CANADA, or on the [website](#).

As the nursery grows in size, there will be the opportunity to hire staff with specialized skills. Until that day, the nursery operator will truly need to be a “Jack-of-all-trades”.

MARKETING

Marketing is the single most difficult aspect of nursery crop production and should be considered well ahead of growing any plants. Unlike many other agricultural commodities, there is no centralized selling agency, such as a marketing board or a nursery plant auction. Nursery operators are on their own when it comes to product marketing. This is further complicated today because each nursery has to compete in the highly competitive North American marketplace.

There are many factors to consider when it comes to marketing. What marketing channels will work best for your situation, and what type of marketing and promotional tools will you use? What will be your market area? Will it include local, domestic or export markets? Shipping product outside your local community increases market size, but it also brings with it the need to know and adhere to regulations designed to prevent the movement of quarantine pests. Further information about these regulations is presented in the *Regulations* section, and in Chapter 2 of the *Nursery & Landscape Pest Management & Production Guide*. In addition, you will most likely have to rely on a commercial trucking firm to transport your product into distant markets. Today, due to increasing fuel costs and a shortage of trucking companies, it is more difficult for nurseries to secure their trucking needs.

Figure 5. A shipment of nursery stock almost ready for delivery. The pots are carefully stacked to maximize the volume of product shipped per load.



Figure 6. Some nurseries are beginning to ship stock on pallets to make loading and unloading easier.



A 2002 survey of BC nursery operations determined that the main marketing tools used by wholesale nurseries differ from those used by retailers¹⁴. Wholesale nursery respondents to the survey spend an average of 2% of their sales on their marketing, advertising and promotion budget. Larger firms spend a smaller percentage of sales on marketing than small firms. The main promotional tools used are trade shows (25% of budget), product catalogues (21%), and buyers guides (16%). Other forms of promotion include: Yellow Pages (3%), trade journals (8%), newspapers (3%), web site (7%) and sponsorship of industry events (4%).

In contrast, the retail nurseries surveyed spent an average of 4.2% of their sales on their marketing, advertising and promotion budget¹⁵. The main promotional tools used are newspaper advertisements (40% of budget), direct mailers/newsletters (15%), flyers (12%), radio

¹⁴ *The Nursery and Landscape Industry in British Columbia*. 2002. BC Landscape & Nursery Association.

¹⁵ *The Nursery and Landscape Industry in British Columbia*. 2002. BC Landscape & Nursery Association.

advertisements (10%) and sponsorship of community events (7%). Other marketing methods used are: television (5%) and in-store clinics (1%).

Marketing Channels - Wholesale versus Retail: There are many markets for nursery crops, including landscape contractors, garden centres, mass merchandisers, other growers, brokers, agricultural producers (e.g. tree fruit and berry growers), and homeowners.

Most nursery crops are sold at the **wholesale** level. The major wholesale market is garden centres, which accounted for 21% of gross farm gate sales in 2004. Other markets include other growers (13%), landscapers (15%) and mass merchandisers (9%)¹⁶.

Brokering is a small but useful market channel for new growers that have a limited product line, insufficient market contacts, and/or poor marketing skills. Brokers enter into agreements with growers to market and sell their product for an agreed upon price. Nurseries that broker product are identified in the BCLNA's *Buyers Guide*.

Nurseries routinely buy stock from **other nurseries** to fill orders. This market channel cannot be relied upon to move stock because sales only occur on an 'as required basis'. To be considered as a potential supplier to other nurseries, it is critical that you are known within the industry. To establish a presence in the industry, it is important to belong to the BCLNA and to participate in industry events and committees. The value of active participation in the Association cannot be overstated.

Direct selling of product to the consumer is attractive because it maximizes price per plant. However, the costs associated with selling the crop are higher. Some drawbacks of retailing are sales occur at the busiest time in the nursery production cycle and retail customers can demand a lot of time. In fact, almost 25% of people have no intention of making a purchase when they visit a garden centre, but instead their intentions are to browse or gather information¹⁷. A 1999 consumer survey completed in BC found that garden centres are the prime source of gardening information for 81% of respondents¹⁸. Books (12%), mass merchandisers (6%), and super markets (1%) are used infrequently. Customer service is extremely important when retailing. Anyone planning to venture into retailing should be people-oriented.

Direct farm marketing businesses must follow many laws and regulations. For instance, some regions have enacted laws that require direct farm markets to have:

- a building permit to ensure compliance with building codes,
- a business license or registration,
- liability insurance,
- product, fire, and/or theft insurance, and
- signs that meet standards with respect to placement, size, location, and type of sign used.

Regulations can vary between municipalities. Assistance with establishing an on-farm retail business can be obtained from your regional direct farm marketing association. A list of the associations in BC is provided under *Marketing* in Appendix 2. Registration for many required licences, as well as business name, export and GST numbers are available [on-line](#).

¹⁶ *Greenhouse, Sod and Nursery Industry*. 2004 Statistics Canada, cat. # 22-202-X1B

¹⁷ Jim Van Dellen, "Advertising Analysis". *American Nurseryman*, November 15, 1998, pages 50-54.

¹⁸ B. McTavish and J. Jarvis. *British Columbia Garden Products and Services Consumer Survey*. February 1999. BC Landscape & Nursery Association.

Mail-order selling is another form of retailing. However, it does not require face-to-face business with the client. Keys to success are the quality of your catalogue and your ability to maintain plant health and vigor during shipping. Obviously the latter point will depend upon the type of plant material, the packaging system, and the type of carrier used. There are two US mail-order associations; the Mail-order Gardening Association and the National Mail Order Association that can provide additional information (see Appendix 2). Tony Avent, Plant Delights Nursery Inc., has written an excellent document on mail-order selling titled "[So, You Want to Start A Mail Order Nursery](#)" that is available on the Internet.

Internet websites can bring the world marketplace to the door of even the smallest nursery business at a reasonable cost. You may register a web domain by conducting an Internet search for web domain registration companies. Professional website design consultants will create a site that effectively showcases your nursery's products.

eBusiness Connection offers BC companies a unique collection of services to help adapt to technological change and access the tools and information needed to grow and remain competitive on a global scale (see Appendix 2).

If you have mail-order or Internet sales outside of Canada, there are costs to meet export requirements. These include Canadian Food Inspection Agency inspection fees that are associated with the issuance of a phytosanitary certificate, and broker fees to prepare the necessary documentation for US Customs. A broker is mandatory for orders over \$1,200. It is important to look into these issues before starting a mail-order business or Internet marketing program. Your Internet site will be accessible worldwide and, therefore, you must also ensure that you have the right to sell each plant to all countries. Internet businesses have been sued for infringing on license agreements.

Product Quality - The #1 Criteria used to Select a Supplier: Crop returns are directly related to crop yield. An increase in crop yield (a reduction in shrinkage) will increase crop returns. Of course, the reverse is also true: a reduction in crop yield will decrease crop returns. A grower must realize and take into account that not every plant grown will develop into a marketable plant. Based on a 2002 industry survey, on average 6.8% of a crop is discarded due to poor health (2.2%), poor sales (1.2%), spoilage (2.5%), and other reasons (0.9%)¹⁹. The quantity of stock discarded each year due to spoilage was reported to range from 0 to 30%²⁰. The level of crop losses can be the difference between a profitable and a non-profitable year.

To maximize crop returns and to meet orders, there is incentive to ship product of lesser quality. Growers may feel that they can compensate a client for accepting low quality stock by shipping extra plants or by offering a price discount. The potential drawbacks of shipping low quality plants are numerous.

- **Nursery clients** will have difficulty growing the plants to a marketable size in the scheduled production period, which will lead to disruption in their future supply of the crop.
- **Retail clients** will receive lower returns per plant and may find it more difficult to sell low quality plants.
- **Landscape clients** will run into several potential problems associated with the receipt of inferior plants, including client dissatisfaction and increased risk of poor plant establishment and the need to replace material in the landscape.

¹⁹ *The Nursery and Landscape Industry in British Columbia*. 2002. BC Landscape & Nursery Association.

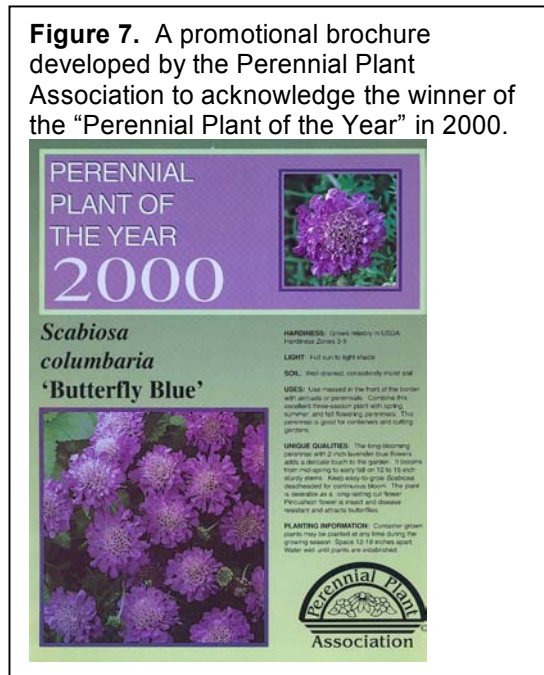
²⁰ *The Nursery and Landscape Industry in British Columbia*. 2002. BC Landscape & Nursery Association.

The end result of shipping inferior plants is often the loss of a client or demands for refunds to compensate for plant losses.

Industry surveys have proven that price is not one of the major criteria that retailers and landscapers use when selecting a nursery as a supplier. Instead, plant quality is the most important criterion²¹. Plant quality incorporates plant health and appearance, and the quality of packaging materials. The level of personal service, consistency of supply, and speed of delivery are all more important criteria to garden centres than price²².

Today, the industry is more aware that high quality packaging materials increase retail sales. For this reason, the traditional black nursery container is being replaced by a multitude of different colored pots, and plant labels are being jazzed-up with color pictures and more extensive information about the plant. A current trend is the use of bigger, and more colorful and informative tags²³.

Retailers are also beginning to look for point-of-sale merchandising materials from growers, including end-of-aisle displays, brochures (Figure 7), banners, and colorful posters. A number of individual nurseries, regional governments, and industry or commodity associations have developed nursery and landscape standards. In BC, the BCLNA and the BC Society of Landscape Architects jointly developed the *BC Landscape Standard*²⁴, which sets standards for nursery plants and landscape installations.



The BC Landscape Standard: This section provides an overview of some aspects of plant grading presented in the *BC Landscape Standard*. Growers are encouraged to review the full Standard for more details on plant grading.

The Standard establishes minimum root / plant size relationships for nursery stock. Root size is equal to the container or root ball size. Above-ground growth is measured by trunk caliper (for standard shade trees over 2.5 m tall), plant height (conifers and standard shade trees up to 2.5 m tall), canopy density and shape (height and spread ratio), or canopy density and plant spread (for spreading evergreens and dwarf conifers). Figure 8 provides an example of the Standard pertaining to plant proportion and canopy density for coniferous evergreens.

The root ball or potting medium should have roots extending throughout it, without being root bound, and should be firm and intact. Containers should be filled to within 2.5 cm of the top of the container. For balled stock, the root ball should have an adequate fibrous root system that

²¹ M.P. Garber and K. Bondari, "Retail Garden Outlets: Plant Material Purchases and Trends." *Journal of Environmental Horticulture*, 16(1):20-26. March 1998.

²² M.P. Garber and K. Bondari, "Retail Garden Outlets: Plant Material Purchases and Trends." *Journal of Environmental Horticulture*, 16(1):20-26. March 1998.

²³ J. Bramwell and B. Grabarek, "Trendy Tags." *American Nurseryman*, August 15, 2005, pages 35-39.

²⁴ *BC Landscape Standard*, 2001 (6th edition). Published by the BC Society of Landscape Architects and the BC Landscape & Nursery Association.

has been developed by proper cultivation practices, and that is tied tightly with burlap and twine.

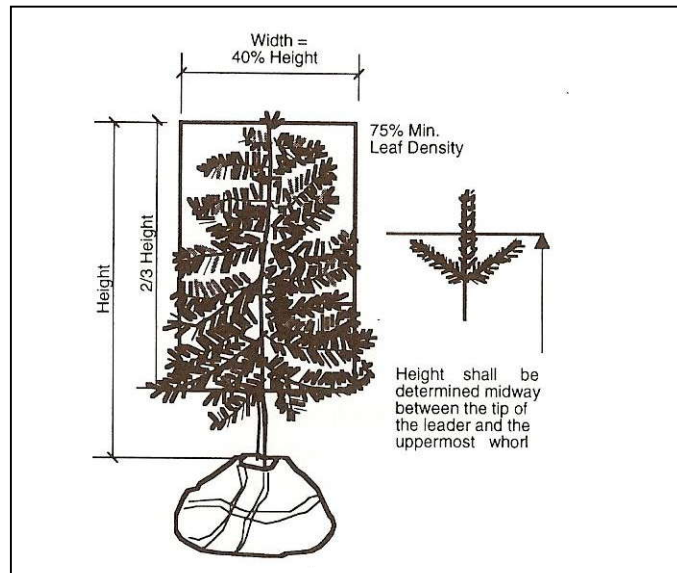
The Standard also addresses ethical issues of wild plant collections, presence of noxious perennial weeds, and plant substitutions.

The Standard is intended to achieve the following goals:

- to standardize the products growers produce,
- to simplify the bidding process for landscape contracts, and
- to ensure proper root growth and pruning to produce a healthy, well-developed plant.

The BCLNA continues to encourage the industry to adopt the Standard. In time, as acceptance of landscape standards increases, the market for lesser quality plants will disappear.

Figure 8. System for Grading Nursery Stock - Example: Tall and Broad Coniferous Evergreens (adapted from the *BC Landscape Standard*²⁵).



²⁵ *BC Landscape Standard*, 2001 (6th edition). Published by the BC Society of Landscape Architects and the BC Landscape & Nursery Association.

POINTS TO CONSIDER WHEN SELECTING A SITE

Most new growers have a farm prior to selecting a crop to produce. This may restrict what ventures can be developed at the site. Some points to consider when evaluating the suitability of a site for nursery production are:

Parcel Size: Nurseries come in all shapes and sizes. Retail production nurseries are commonly less than 10 hectares. Wholesale production nurseries vary tremendously in size, and range from less than one hectare to hundreds of hectares. The size of the operation is strongly influenced by the relative amounts of container and field stock produced. For nurseries in BC, the average area of container production is 5 hectares and of field production is 30 hectares²⁶. An allowance for future expansion should be taken into consideration.

Location: Proximity to hydro, phone lines, service roads, labour supply, and, if you choose to direct-market from the farm, proximity to a large population base is important. Approximately 83% of a garden centre's customers are drawn from an 8-24 km radius²⁷. A recent US survey found consumers to rate store location more than twice as important as plant quality, plant selection, and customer service²⁸. Store location was the #1 consideration for repeat customers²⁹. However, a similar survey conducted in BC found only 1.5% of respondents to rate proximity to a retailer as an important factor in their buying decision³⁰.

History of the Site: Becoming informed about previous uses of the site may uncover potential problems before committing to the capital outlay of developing and stocking the site. Valuable information to gather includes previous crops, contamination problems, underground structures, drainage history and location and condition of subsurface drainage installations.

Soil Requirements: The site should have a slight slope, have no frost pockets, and be well drained. Drainage systems, including pumps for very low areas, must be installed before planting. Additional soil requirements that apply for field-grown stock include:

- good soil structure and free of stones,
- a loam top-soil of at least 60 cm depth; clay loam is required for the production of balled stock, whereas sandy loam is best for bareroot production,
- freedom from serious pests or pesticide residues that may be injurious to newly-planted stock, and
- a pH of 5.0-7.2, however, if the pH is outside this range it can be corrected.

Contracting soil surveys and testing can help to determine quality, character and usefulness of the site. There are several soil test labs in BC (see *Laboratories*, Appendix 2). These labs can analyze soil for crop nutritional requirements, and may also be able to investigate concerns about soil contamination or evaluate soil physical properties such as texture, porosity or particle size distribution. Refer to the [Ministry's Soil Sampling factsheet](#) (Reference # 611.100-1) for more information on when and how to collect a soil sample.

²⁶ *The Nursery and Landscape Industry in British Columbia*. 2002. BC Landscape & Nursery Association.

²⁷ D. Ference and Associates. *Profile of the BC Nursery Industry*. April 1991. BC Nursery Trades Association.

²⁸ Jim Van Dellen, "Advertising Analysis". *American Nurseryman*. November 15, 1998, pages 50-54.

²⁹ Jim Van Dellen, "Advertising Analysis". *American Nurseryman*. November 15, 1998, pages 50-54.

³⁰ B. McTavish and J. Jarvis. *British Columbia Garden Products and Services Consumer Survey*, February 1999. BC Landscape & Nursery Association.

Contact the BCLNA for a listing of consultants that can provide professional advice on the suitability of the soil and the topography.

Water Source: The availability of sufficient quantities of reliable, good quality irrigation water is very important. Before purchasing farm land, you should have the flow rate and water quality of the irrigation source tested.

The water supply system should have a minimum capacity of 40 litres per minute. Water quality parameters to test include dissolved solids, pH, alkalinity, and the levels of total salinity and specific salts (e.g. calcium carbonate, sodium, and boron). Refer to the Ministry's factsheet titled [Irrigation Water Quality for BC Greenhouses](#) for information on factors that affect water quality, treatment methods to improve water quality, and on irrigation water quality guidelines. The *BC Trickle Irrigation Manual* also contains excellent information on assessing water quality, flow rates and water requirements, and design, selection, installation and maintenance of trickle irrigation systems. It can be purchased from the Irrigation Industry Association of BC.

Laboratories in BC that do water quality testing are listed in Appendix 2.

Detailed information on drainage and irrigation systems is available from the Ministry's Resource Management Branch in Abbotsford, or on their [BCMAL web site](#).

SITE DESIGN AND LAYOUT

The nursery site must have the facilities required to operate the business , which will depend on the crops produced. Will you be a propagator? Will you grow container or field stock, or both? Some of the facilities and production systems that may be required for a container operation include:

- production facilities: greenhouses, gravel or groundcloth-covered container beds, and shade structures
- water supply equipment, irrigation and drainage systems, and a backup electricity generator
- other facilities: shipping and handling areas, cold storage, chemical storage, equipment repair and storage facilities, parking, and facilities for staff

The design and layout will affect the profitability of the nursery. The site should be designed to allow for efficient movement of plants and vehicles between the different zones of production, and to allow for future expansion. It should also be designed to meet local bylaws and to prevent the release of pollutants into the environment. The Environmental Farm Planning *Reference Guide* provides information on various environmental laws and makes suggestions for environmentally sound farm practices. The *Reference Guide* is available from the BC Agriculture Council and on the [BCMAL website](#). Other useful sources of information are the publication on site layout titled *Container Nursery Design* from American Nurseryman Publishing Co. and books on general nursery production (See Appendix 3).

DEVELOPING A BUSINESS PLAN

A business plan will cover the crops grown, evaluate market size and potential sales, capital costs required to set up the facility, and estimate returns. It will integrate written goals with marketing, production and financial targets into a management strategy for the operation. A business plan will outline what you have to do to make your business successful.

The BCLNA and the BCMAL produced a publication titled *Preparing a Business Plan – Wholesale Nursery Example* that is designed to assist new producers to create a business plan using a step-by-step process. The document is available on the [BCMAL's web site](#). The authors of the document presented the following four benefits of preparing a business plan³¹.

1. “It can improve performance by identifying both strengths and weaknesses of operation, and potential problem areas.
2. It can provide a solid basis for measuring performance.
3. It establishes a framework for making key decisions in ongoing management and in evaluating new opportunities.
4. The plan and the process can be used to educate and motivate employees.”

A business plan is invaluable for communicating information about your business to others, such as money lending institutions, which often require a business plan for small business loans.

The Farm Credit Corporation helps farmers to access capital to start or expand an existing business. The Corporation supports primary producers through all three lines of their business – farm finance, agribusiness and alliance partnerships. For further information about these programs, contact Farm Credit Canada at 1-888-332-3301 or review their [website](#).

The Ministry of Agriculture and Lands does not provide producers with grants to assist them to start or expand a farm business.

³¹ P. Davidson. *Preparing a Business Plan, A Guide for Agricultural Producers – Wholesale Nursery Example*, 1996. BC Nursery Trades Association and the BC Ministry of Agriculture, Fisheries and Food.

CROP SELECTION

Nursery crops can be divided into eleven distinct categories (Table 4). But which crop should the new grower produce? That is an impossible question to answer without experience in the industry.

Table 4. General categories of nursery plants grown in BC with examples.

Upright Evergreens	<i>Thuja occidentalis</i> 'Smaragd', <i>Picea pungens</i> 'Hoopsi'
Deciduous & Flowering Trees	<i>Acer palmatum</i> 'Bloodgood', <i>Malus</i> 'Echtermeyer'
Broadleaf Evergreens	<i>Rhododendron</i> 'Nova Zembla', <i>Euonymus fortunei</i> 'Emerald Gaiety'
Spreading Evergreens	<i>Juniperus horizontalis</i> 'Bar Harbour'
Deciduous Shrubs	<i>Cornus alba</i> 'Elegantissima', <i>Potentilla fruticosa</i> 'Yellow Gem'
Herbaceous Perennials	<i>Hosta sieboldiana</i> 'Elegans', <i>Heuchera micrantha</i> 'Palace Purple'
Vines & Ground Covers	<i>Clematis jackmanii</i> , <i>Arctostaphylos uva ursi</i> 'Vancouver Jade'
Tree Fruits	<i>Malus x</i> 'Wijcik', <i>Prunus virginiana</i> 'Shubert'
Roses	<i>Rosa</i> 'Winnipeg Parks', <i>Rosa</i> 'Meikrotal' (Scarlet Meidiland®)
Native Plants	<i>Cornus canadensis</i> , <i>Mahonia aquifolium</i> (<i>Categorizing Native Plants Commercially Grown in BC (1999)</i> lists native plants based on their level of production and perceived demand. This publication is available from the BCLNA.)
Aquatic Plants	<i>Nymphaea</i> spp.

There are several factors to consider when selecting which crops to grow. Site conditions, specific plant factors, supply and demand, market trends and profitability should all be analyzed to provide the necessary information in making wise crop selections. Also, the amount of time and effort a new grower is willing to expend on the crop will determine which crop is suited to the operation.

The suitability of plant species for the soil and climate conditions at the nursery is an important factor³²; a successful, high quality, healthy crop is more likely with well adapted plants. Growing borderline hardy species presents a greater risk of crop failure and increases production costs due to more diligent winter protection requirements. Drought tolerant species will reduce the need for irrigation, however, they will not tolerate field conditions with heavy, wet soil.

Plant factors, such as the degree of difficulty of propagation and the crop's susceptibility to pests and diseases, will affect the relative ease of growing the crop. A new grower's level of production expertise may determine whether specific plant factors are a constraint in crop selection. An industry survey indicates that while ease of care and growing is an important consideration for growers, production expertise is not³³.

Industry surveys indicate that established nurseries select new crops based largely on crop demand, and market trends^{34, 35}. They use past sales records, input from clients (landscapers,

³² D. Ference and Associates. *Profile of the BC Nursery Industry*, April 1991. BC Nursery Trades Association.

³³ D. Ference and Associates. *Profile of the BC Nursery Industry*, April 1991. BC Nursery Trades Association.

³⁴ D. Ference and Associates. *Profile of the BC Nursery Industry*, April 1991. BC Nursery Trades Association.

³⁵ *The Nursery and Landscape Industry in British Columbia*, 2002. BC Landscape & Nursery Association.

landscape architects, other growers and garden centres), and nursery visits to determine supply and demand trends³⁶. The rarity of a species is also a factor for some growers³⁷. Growing new or unusual plants can offer good profit margins because they are not widely available. However this situation can change quickly as more nurseries begin to propagate the crop and, correspondingly, increase supply. Profit margins are also influenced by production costs, production period, product quality, and market price.

Growers without previous experience in the nursery industry do not have the benefit of reviewing past sales records and production costs. It is useful for new growers to conduct thorough market research to determine current and future supply and demand, and market trends. Projections of production costs are also an important analytical tool to determine potential profit margins of various crops.

Market Research: Market research can be performed by yourself or by a consultant. Contact the BCLNA for a listing of local consultants.

General information can be obtained from trade journals and conversations with people in the industry. Trade journals frequently contain information on new plant introductions and market trends (Table 5). The December 15th edition of *American Nurseryman* is annually dedicated to new plants for the coming year. Information on such items as ornamental features, propagation methods, pest problems, and availability are highlighted for each woody ornamental, perennial, and vine and aquatic plant that is showcased.

Appendix 3 contains a list of the major trade journals. These publications are available at public, college and university libraries. The Internet is another good source of information. If you do not have Internet access, it is available at all public libraries in BC.

Table 5. Predicting the Future: One author's views on 'consumer preference'³⁸

- colour still attracts, but the shades are more sophisticated
- plants that have a long-lasting show that may include, in addition to 'showy' flowers, colourful foliage or bark, long-lasting berries, or intriguing plant forms and textures
- dwarf, slow-growing plants for the modern small-space garden
- plants that are low-maintenance, which includes plants that are well adapted for 'special', more stressful locations in the garden

[Statistics Canada](#) has a very flexible, user-friendly Internet site that provides detailed trade data for a wide range of nursery crops. For each query you must specify the region of origin (exporter) and destination (importer), and the month or year for which you want trade data. The regions to select from include Canada or individual provinces, the US or individual states, or a wide range of other countries. There is a fee for using this service. However, you are notified of the cost of the query before payment is required. You can enter the 'Online Statistics' section in the 'Products and Services' option.

Make an effort to attend industry events. They provide an excellent opportunity to network with and learn from people in the industry. Look for and attend seminars on new plants and on industry trends. These are common topics at industry seminars and conferences. The BCLNA's trade magazine, *HortWest*, is a good reference for information on upcoming local industry events. Some events to look for are listed below.

³⁶ *The Nursery and Landscape Industry in British Columbia*, 2002. BC Landscape & Nursery Association.

³⁷ D. Ference and Associates. *Profile of the BC Nursery Industry*, April 1991. BC Nursery Trades Association.

³⁸ K. Druse, "Fulfilling Dreams." *American Nurseryman*, April 1, 1998.

- Industry seminars offered by colleges, retail garden centres, and the BCLNA.
- Regular BCLNA meetings for retail, grower, and landscape members, which are held in the Interior, Fraser Valley, and on Vancouver Island. Individuals who are not members of the Association are welcome to attend.
- Trade shows which showcase the industry's newest equipment, products and services. In addition, they may have seminar sessions and industry tours. Table 6 lists some of the major local trade shows. Up to date information on trade shows in Canada, the US and overseas is available in the November 1st issue of *American Nurseryman*, and on the websites of the [Landscape Ontario Horticultural Trades Association](#) and the [BCLNA](#).

Table 6. Major Trade and Garden Shows in North America. Addresses for the show organizers are provided in Appendix 2.

British Columbia:

CanWest Hort Show is an annual fall event held at the Vancouver Convention & Exhibition Centre. It has a 430-booth trade show, professional seminars, and industry tours. Contact the BCLNA at 604-574-7772 or by email at info@canwesthortshow.com for further information.

Pacific Agriculture Show & Horticulture Growers' Short Course is held annually during the third week of February at the Abbotsford Tradex Centre. The event combines a 200-booth trade show featuring all agricultural sectors, including the nursery industry, plus professional seminars. For more information contact the Lower Mainland Horticulture Improvement Association at: (604) 556-3001.

The Vancouver Sun Garden Show at VanDusen is held in June at the VanDusen Botanical Garden in Vancouver. It showcases services and products available through the nursery industry. For further information contact the show management: Fireworks Marketing Group at (604) 687-4780 or visit their [website](#).

The Victoria Flower & Garden Show which is held in late-July at Topaz Park in Greater Victoria. For more information, [email](#).

The Prairies:

The Green Industry Show & Conference is an annual show held in November at the Shaw Conference Centre in Edmonton. The event is organized by the Landscape Alberta Nursery Trades Association (LANTA). For information about this event, contact LANTA at: (780) 489-1991 or visit their [website](#).

Ontario:

Landscape Ontario Congress is an annual event held in January at the Toronto Congress Centre. It features over 7 acres of trade show floor, which accommodates 650 exhibitors, and seminar sessions. Contact Landscape Ontario via the [website](#) for more information

US:

Farwest Show and Seminars is held in late-August at the Oregon Convention Centre in Portland. It features a large trade show, 3 days of professional seminars, and industry tours. Information on the event is available on the [Oregon Association of Nurseries website](#).

Taking regular walks through garden centres can also provide information. You can learn the relative sales per crop based on space allocation, the quality and labeling that are critical components of marketing, and the new crops being promoted in the industry. Garden centres

and landscapers purchase nearly 60% of the products grown by wholesale nurseries³⁹; they know as well as anyone which plants are in demand and in short supply in the industry.

Keep in mind that the most popular plants may not be the most profitable or the best to grow for your location and soil type. They may be in excess supply and therefore may not offer the desired contribution margin. Hedging cedars are a good example. There is extremely high demand for hedging cedars in the North American market. However, due to annual cycles in the volume of production and demand, prices for the crop vary considerably between years. Beginning in the late 1990s, the production of hedging cedars in BC and elsewhere increased significantly. Concerns of overproduction were realized in 2005, as the price dropped for balled hedging cedars due to over supply.

Also, avoid crops that are fads, especially those that are quick to grow to market size. Base crop selection decisions upon market trends. Fads have short-lived periods of high returns, followed by low prices and over supply.

The Citrosa Fad

The "citrosa" plant is an example of a nursery fad. Citrosa is an attractive, lemon-scented geranium. The plant was so-named because it produces citronella oil, which is a proven mosquito repellent.

In the spring of 1992, the citrosa plant was widely promoted as a mosquito repellent. Consumers were told that potted plants would repel mosquitoes from outdoor living areas and that a higher level of protection could be achieved by wiping leaves on the skin. Sales for the plant were very strong and wholesale prices were very high. Later that summer, demand for the citrosa plant vanished amid reports that it was ineffective at repelling mosquitoes. The plant contains very low levels of citronella. In fact, some forms of lemon balm contain almost 400 times more citronella than the citrosa plant.

The citrosa market was very lucrative for some suppliers while the demand lasted!

Only through experience selling nursery stock can you truly gain an appreciation of the complex issue of crop demand. Once you have developed a good reputation in the industry, the day will come when you are overwhelmed with information from your clients on 'what's hot'. Making decisions on what crops to grow will be an annual event.

New and Improved Plants: There is always strong consumer demand for new and improved plants. Nurseries and retailers can use new plants effectively as a 'hook' to expand their client base, since there are often few suppliers. For the grower of a new plant, this is an opportunity to get a foot in the door with a new client. The success in turning this initial contact into a long-term client will depend upon product quality and service, which are covered elsewhere in this document.

A wide range of new plants are introduced each year from individual breeders and nurseries, botanical gardens, and government institutions. Nursery managers know the value of new plants and want to keep abreast of their development. Therefore, the topic is frequently covered in trade magazines and in conference seminars.

The [Plant Introduction Scheme of the Botanical Garden](#) (PISBG), which is located at the University of BC, was a leader in the breeding and promotion of new nursery plants in the 1980s and 1990s. A few of the PISBG releases that have received broad industry acceptance have been *Arctostaphylos uva-ursi* 'Vancouver Jade', *Artemisia stelleriana* 'Silver Brocade', *Genista pilosa* 'Vancouver Gold', *Potentilla fruticosa* 'Yellow Gem', and *Viburnum plicatum*

³⁹ D. Ference and Associates. *Profile of the BC Nursery Industry*, April 1991. BC Nursery Trades Association.

'Summer Snowflake'. *Lonicera* 'Mandarin', the featured new introduction from the PISBG in 1998, was the top selling perennial vine in Europe.

The PISBG introductions are registered with the International Plant Registration Authority and the Canadian Ornamental Plant Foundation (COPF). In order to propagate the material, once the plant is released to the trade, a nursery must be registered with the COPF. In addition, they are required to submit regular propagation reports and remit the appropriate royalty payments.

In addition to new plants, consideration should be given to growing award winning plants. Some associations (e.g. American Hosta Society and the Perennial Plant Association) annually present a 'Plant of the Year Award'. The award winning plants often are not new to the industry, but rather deserve recognition for their unique qualities and proven reliability. In the case of the Perennial Plant Association's 'Plant of the Year Award', the winner is chosen based on voting by the Association's membership (see Table 7).

Table 7. Winners of the Perennial Plant Association's 'Plant of the Year Award'.

1990 - <i>Phlox stolonifera</i>
1991 - <i>Heuchera micrantha</i> 'Palace Purple'
1992 - <i>Veronica</i> 'Sunny Border Blue'
1993 - <i>Coreopsis verticillata</i> 'Moonbeam'
1994 - <i>Astilbe</i> 'Sprite'
1995 - <i>Perovskia atriplicifolia</i>
1996 - <i>Penstemon digitalis</i> 'Husker Red'
1997 - <i>Salvia</i> 'May Night' ('Mainacht')
1998 - <i>Echinacea purpurea</i> 'Magnus'
1999 - <i>Rudbeckia fulgida</i> var. <i>sullivantii</i> 'Goldsturm'
2000 - <i>Scabiosa columbaria</i> 'Butterfly Blue'
2001 - <i>Calamagrostis x acutiflora</i> 'Karl Foerster'
2002 - <i>Phlox</i> 'David'
2003 - <i>Leucanthemum</i> 'Becky'
2004 - <i>Athyrium niponicum</i> 'Pictum'
2005 - <i>Helleborus x hybridus</i>
2006 - <i>Dianthus gratianopolitanus</i> 'Feuerhexe' (Firewitch)

Strong consumer interest in new plant introductions and 'Plant of the Year' recipients is almost assured due to the extensive promotional campaigns that accompany their release.

It is important to do your homework when selecting new crops. The label 'new' does not always mean the plant is 'better'. It is very disheartening and expensive to propagate large numbers of a new crop only to find out there is no demand. Industry demand for a crop can subside quickly if it is found to be difficult to grow, has a serious pest problem, or performs poorly in some geographic regions. For example, the demand for ash trees declined dramatically in 2005 due to concern over the impact of an exotic pest, the emerald ash borer. Since being first detected in southeastern Michigan and Windsor, Ontario in the summer of 2002, the borer has killed more than five million ash trees⁴⁰.

In addition, before propagating any plant, it is advisable to determine if it is protected by a patent, trademark, or is registered with the Canadian Ornamental Plant Foundation (COPF).

Plant Patents: In Canada, the *Plant Breeders' Rights Act* was given Royal Assent in 1990. This legislation makes it possible for breeders to legally protect new plant varieties for up to 18 years. Thereby, providing compensation for the considerable time, expertise and money a breeder invests in the development of a new variety.

The intent of the legislation is to stimulate plant breeding in Canada, to provide Canadian producers better access to foreign varieties, and to facilitate the protection of Canadian

⁴⁰ D. Balser and D. Todd, "Emerald Ash Borer". *The Buckeye*, January 2005.

varieties in other countries. In order to be eligible for protection, the plant must be new, distinct, uniform, and stable.

A species must be prescribed by regulation before an application for plant breeders' rights can be made. The nursery crops currently prescribed by regulation in Canada are apple, begonia, blueberry, cherry, chrysanthemum, clematis, dianthus, grapevine, impatiens, maple, peach, pear, pelargonium geranium, plum, potentilla, raspberry, rose, spirea, strawberry, viburnum and yew.

Plants must be registered in each country where protection is desired. A plant registered in another country, but not in Canada, can be legally propagated and sold in Canada. However, it would be an offence to offer the plant for sale in a country where it is registered, if you are not licenced to do so. Lawsuits have been filed for infringement of patents and trademarks based on plants being offered for sale on Internet web sites. Be very careful about listing patented or trademarked plants for sale on the Internet if you are not licenced to sell the material in all countries where the plant is protected.

Contact the Plant Breeders' Rights Office (see the *Government* section in Appendix 2) to apply for a plant patent, or to obtain information on plants patented in Canada. When a plant is awarded protection through the Act, it is published in the *Plant Variety Journals*.

Canadian Ornamental Plant Foundation (COPF) - is a non-profit corporation founded to facilitate the introduction of new and improved horticultural cultivars in Canada. The Foundation works with growers to simplify the complex world of royalties, and will work with plant introducers to help them make money on their introduction. The main activity of the COPF is to collect royalties on behalf of plant breeders. The money collected, less 12-15% for administration costs, is paid to the breeders on a quarterly basis. Thereby, the Foundation encourages plant breeding and the development of new plants for the benefit of the entire horticulture industry.

There are about 2,100 plants registered with the COPF. The Foundation annually releases a compendium of their new ornamental plant registrations. In 2002, the COPF released 359 new introductions from 25 different breeders, including 10 Canadian plant breeders. Eighty-nine of the introductions were nursery crops (excluding annuals). New rose cultivars accounted for 25% of the nursery plant registrations.

Trademarks - the use of trademarks is an increasing trend in the nursery industry (see *American Nurseryman*, October 1, 1998, pages 91-97, for an excellent article on trademarks). The reasons for using trademarks are they protect the marketing interests for perpetuity and they are less costly to enforce than patents.

The symbols TM (or SM) or ® are used to designate a trademarked name. A plant's cultivar name and the name of a patented plant cannot be trademarked. For instance, the Flower Carpet® Yellow rose is protected by a registered trademark, but its cultivar name, *Rosa* var. 'Noason', is not.

Crop Specialization versus Diversification: You should also consider whether to produce a specialized or diversified mix of crops. Crop specialization has the advantages of allowing standardization of production methods and materials, requires a narrower range of knowledge, and enables more specialization of equipment and marketing. However, specialists are more vulnerable to sudden changes in crop demand or supply.

Most nursery stock is grown for speculative markets. It is uncommon for a nursery to have a written contract for a crop at the beginning of its production cycle. Annual production volumes

represent projected crop sales, and are based on long-term sales trends and market research. The economic principles of supply and demand are very important to nursery operators because of the speculative nature of nursery stock sales.

Cycles in supply are common for nursery crops. Over supply is the biggest concern, since it can lead to depressed prices. Over supply is a risk in the industry because:

- it is relatively easy for new producers to enter the marketplace, since there are no marketing boards or quotas to control the volume of production,
- there is a vast array of substitutes for any given crop in the marketplace - substitutions can occur between different species (e.g. *Potentilla fruticosa* 'Yellow Gem' for *Spirea japonica* 'Little Princess') or varieties (e.g. *Rhododendron catawbiense* 'Boursault' for *R.* 'Roseum Elegans'), and
- nurseries often cannot quickly adjust production levels in response to changes in demand, since it can take up to 4 years for a crop to reach a marketable size.

The fact that nursery managers have no control over the two major factors determining the annual demand for nursery crops, the economy and the weather⁴¹, makes the situation less tenable.

Downturns in the economy or poor spring weather can reduce the ability and interest of gardeners to purchase nursery crops. These conditions may also result in shifts in consumer buying patterns. For instance, consumers may prefer to purchase lower priced plants, such as bedding plants over trees and shrubs. This will reduce the total value of plant sales, but may actually increase the demand of specific plants.

One way to provide some protection against changes in crop demand and supply is to diversify the range of crops produced and the markets targeted.

The Type and Size of Stock to Produce: The size of stock produced and the type of production system used must also be considered. Will you grow liners or larger stock sizes? Will you grow in containers or in the field? Answers to these questions will be based on many factors, including individual skills, the type of equipment already possessed by the farm, the size of the farm, the type and quality of the soil resource, and personal interest.

⁴¹ M.P. Garber and K. Bondari, "Retail Garden Outlets: Business Characteristics and Factors Affecting Industry Performance." *Journal of Environmental Horticulture*, 16(1):15-19. March 1998.

Figure 9. Container-grown 'Rheingold' cedars in a poly-covered hoop house.



Figure 10. Outdoor, field-grown nursery stock.



Virtually all nursery stock is started as liners. A liner is a small plant that is usually transplanted into a #1 (one gallon) container or into field soil for growing-on, to produce a larger plant that is better suited for retail or landscape sales. Some nurseries specialize in the production of liners. The crop may be sold to retailers and landscapers, but the major market is other growers. Even though the majority of nurseries do in-house propagation, this production does not usually meet their needs. Based on a 2002 industry survey⁴², in-house production of liners supplies on average 58.5% of a nursery's needs. Therefore, nurseries rely on other suppliers to satisfy their liner requirements.

There are many reasons for purchasing liners from other growers, such as:

- it is more cost effective, since production costs for specialty propagators should be lower due to economies of scale and greater automation,
- to compensate for in-house crop failures,
- the nursery has poor success propagating the crop,
- the crop is very new to the market and the nursery has not yet established sufficient stock plants to propagate the quantity they need,
- propagation requires very specialized skills and equipment, which some nurseries do not possess and do not want to invest in, and
- the crop can only be propagated by very specialized methods of propagation, such as grafting, budding, or tissue culture.

Traditionally, nursery production was all soil-based, either being harvested bareroot or with a ball of soil that is usually wrapped in burlap and tied. This latter stock is referred to as balled & burlapped or B&B. However, today roughly 60% of all nursery plants sold in the US are container-grown⁴³ and, the industry trend is towards more container production, at the expense of field production. Some reasons for the shift towards container production are:

⁴² *The Nursery and Landscape Industry in British Columbia*, 2002. BC Landscape & Nursery Association.

⁴³ "News Watch. Horticultural Research Institute Funds Development of Mechanized Container-Handling System". *American Nurseryman*, January 15, 1999, page 10.

Figure 11. Digging a field-grown tree with a tree spade.



Figure 12. The root ball is wrapped in burlap and secured with a wire basket.



- the high cost of land in BC,
- returns per hectare can be more than 15-fold greater for container versus field production,
- customers prefer container stock due to its uniformity, ease of handling, and improved establishment,
- greater opportunity for mechanization: mechanization is required for large-scale production to be competitive,
- the ability to harvest and transplant stock during most of the year,
- plant harvesting is not affected as much by poor weather,
- it results in accelerated crop growth, and
- it does not directly lead to soil erosion.

There is a tremendous range in container sizes used by the industry. Containers range from liners (e.g. multiple-celled plug trays and 7 to 15-cm pots) to large pots (1 to 5 gallon) and tubs (7 to 25 gallon). The BC nursery industry has adopted the nursery stock container classes of the American National Standards Institute (ANSI Z60.1-1996). This system defines container classes based on minimum and maximum volumes. The number designation refers approximately to the container volume in gallons. For instance, a #1 pot must have a volume of 2.5 to 4.1 litres⁴⁴. The container standards are listed in the *BC Landscape Standard* that can be obtained from the BCLNA.

Growers that sell container stock to US retailers need to be aware of US labeling requirements. In 2005, US regulators notified the retail sector that container stock must comply with the *Uniform Weights and Measures Law* and the *Uniform Packaging and Labeling Regulations*. The intent is to provide accurate labeling to assist consumers to compare similar products. If a plant is sold in a 1-gallon pot, the container must have a volume of 1-gallon.

⁴⁴ *BC Landscape Standard*, 2001 (6th edition). Published by the BC Society of Landscape Architects and the BC Nursery Trades Association.

This legislation requires that three kinds of information be easily accessible to the consumer, either on signage or on the container label, including:

- a declaration of identity - the common or botanical name of the plant,
- a declaration of net contents - must describe the contents by weight, measure (container volume) or count, and the quantity declaration must be presented in Imperial and metric measure, and
- a declaration of responsibility – the name of the business that grew, brokered or retailed the item.

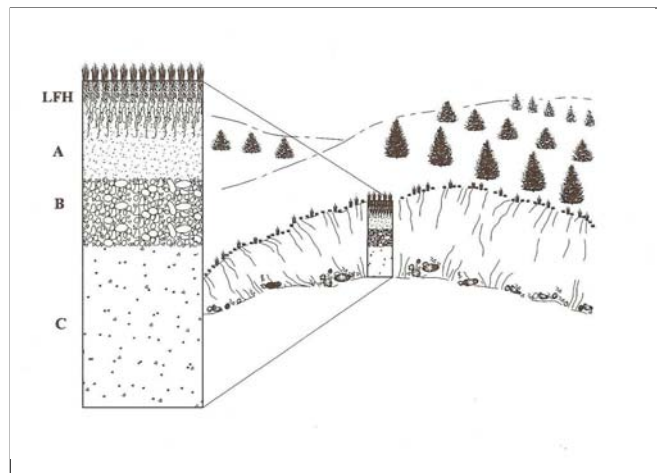
Relative to field production, container production has several disadvantages. First, it has higher capital investment. Building and machinery replacement costs are 3-fold higher for container versus field production, and the difference is even greater if the container operation has a propagation greenhouse or pot-in-pot beds. Second, it requires a higher level of management due to the greater dependence on supplemental irrigation and nutrition. Third, the grower must deal with the problem of wind-throw of containers. Fourth, there is a greater threat of root damage as a result of root exposure to more severe temperatures.

The impact of soil removal on land productivity should not be ignored if you choose to produce balled stock.

Soil consists of several distinct layers (refer to Figure 13), including the A horizon, and the underlying B and C horizons. The A horizon or topsoil contains large quantities of organic matter and plant nutrients, relative to the B and C horizons.

Organic matter consists of plant and animal tissues in varying stages of decomposition. Soil organic matter has an important role in soil productivity. It improves soil structure, aeration, water penetration, and moisture-holding capacity, and it is largely responsible for nutrient availability in the soil. Removal of soil from the A horizon, which occurs when balled stock is dug, results in a reduction in the soil organic matter content and, thereby, reduces soil productivity. About 470 tons of soil per acre, or 7 cm in 5 years, is removed with the harvest of trees with a 100 cm root ball⁴⁵.

Figure 13. A soil profile⁴⁶ showing the LFH layer, which contains non-decomposed and partially decomposed litter, and the A, B, and C horizons. The A horizon is the first layer of true mineral soil and the topsoil layer, the B horizon is the subsoil, and the C horizon represents the soil parent material.



⁴⁵ Davidson, H., Mecklenburg, R. and Peterson, C. 1988. Nursery Management Administration and Culture. Prentice Hall, NJ.

⁴⁶ *Environmental Guidelines for the Nursery & Turf Industry in British Columbia*, 1994. Published by the BC Ministry of Agriculture, Fisheries and Food.

The addition of compost or manure, and the use of cover crops are recommended to encourage the development of fertile and deep topsoil. This will result in a greater proportion of the soil removed during tree harvest consisting of added materials, thereby reducing losses of native soil. Other management practices recommended to reduce soil loss are presented in the Ministry's *Environmental Farm Plan Reference Guide*.

A new container system that has been adopted by several nurseries in BC is the pot-in-pot system. This system incorporates a typical nursery container that is placed within a plastic liner embedded in the soil. If poor soil drainage does not permit the use of the in-ground system, a system has been developed for use above ground.

Figure 14. A field of pot-in-pot produced shade trees.



Figure 15. The pot-in-pot crop can be easily removed from the liner pot that is embedded in the soil.



The pot-in-pot system is an alternative to field production for larger nursery stock. The system incorporates the benefits of container systems and eliminates some of the disadvantages. The pot-in-pot system eliminates wind-throw of containers and heat-induced root damage during the summer, and reduces winter damage to the root system. The biggest drawbacks of the system are the cost and preventing root growth out of the drain holes and into the soil. Pot-in-pot production may not be practical in the wet coastal areas because of drainage problems.

The BCLNA's *Buyers Guide* provides information on the types of plants grown in the field and the approximate volumes of production. The web version, which is called [Plant Finder](#), provides information for different species and varieties, whereas the booklet only provides information for crop genera. The *Buyers Guide* is also an excellent resource to identify suppliers of nursery stock.

Comparison of Relative Production Costs of Different Stock Types: Table 8 lists the relative direct expenses for three representative crop sizes, including liners, #1 containers, and balled stock. There are major differences in the proportion of direct expenses attributed to crop supplies and labour, with liner crops requiring significantly higher labour and less crop supplies, relative to #1 containers and balled stock. Labour requirements will depend largely on the efficiency of the nursery layout and on the adoption of mechanization. For many new growers, the scale of your operation will not justify purchasing the latest mechanized equipment nor, in some cases, even basic mechanized systems. For instance, an industry survey found that small growers (sales of \$100,000 to \$300,000) do not have automated

potting equipment⁴⁷. In contrast, 16.8% of medium-sized growers (sales of \$300,000 to \$1 million) and 43.9% of large growers (sales in excess of \$1 million) do have automated potting machines⁴⁸. Without automated systems, costs of production can be expected to be higher for a new nursery relative to an established, larger nursery.

Figure 16. Automated pruner for use with a rolling table system.



Figure 17. Retractable roof greenhouses are very versatile; automation enables variable shade control and excellent ventilation.



A shortage of skilled labour in some of the major nursery producing regions (e.g. Germany and the US) is driving the development and adoption of mechanization. One exciting area of mechanization is the development of robotics systems. In the US, work is in-progress to transfer robotics technologies developed by the National Aeronautics and Space Administration (NASA) to nursery container production. A goal of the project is to develop technology that is useful to midsize growers. In the future, there will be greater use of automated systems in the nursery industry. This will reduce production costs, but will increase capital costs.

⁴⁷ *The Nursery and Landscape Industry in British Columbia*. 2002. BC Landscape & Nursery Association.

⁴⁸ *The Nursery and Landscape Industry in British Columbia*. 2002. BC Landscape & Nursery Association.

Table 8. Comparison of Direct Expenses Incurred with Liner, Container, and Field-Grown Deciduous Stock.

Direct Expense	6 cm Liner Deciduous Shrub ⁴⁹	#1 Deciduous Shrub ⁵⁰	Field-Grown Deciduous Tree ⁵¹
Crop Supplies (planting stock, media, fertilizer, pesticides, pots, flats, and plant tags)	29%	81.4%	69.5%
Utilities / Fuel	13%	0.2%	6.3%
Repairs & Maintenance	4%	0.2%	3%
Labour (taking and sticking cuttings, potting, pest control, grading and loading, driving, field preparation)	44%	15.2%	19.2%
Marketing	10%	3%	2%

There are also differences in the returns and capital costs. Liner crops have higher returns per unit area, higher costs for buildings and machinery, and lower land requirements, relative to #1 pots and field-grown caliper stock. The major capital cost with liner production is the propagation greenhouse, whereas for container and field-grown stock it is tractors and associated equipment.

A 2002 industry survey of nursery growers, conducted by the BCLNA, concluded that "operations with 80% or more acres in field production return median sale of about \$9,000 per acre [per year]. Operations with 80% or more acres in container and/or greenhouse/polyhouse production return median sales of about \$140,000 per acre. Operations with no field production at all return median sales of about \$155,000 per acre."⁵²

Method of Propagation: There are many different propagation methods used to produce nursery crops. The method used depends on the nursery's propagation skills and which method is most cost effective for the crop.

Most nursery crops are produced from seeds, cuttings, or divisions. Production from seeds is generally the least expensive method. However, plants generated from seeds are not generally identical to their parents, and thus this method is not suitable for most cultivars.

In order to maintain the unique characteristics of a cultivar, it is necessary to use an asexual method of propagation. Rooting of cuttings and plant division are common asexual methods.

Grafting (Figure 18), budding, and tissue culture techniques are also important methods. However, their use is limited because they are labour-intensive and require very specialized skills and equipment. Grafting, budding, and tissue culture methods are usually reserved for high value crops that cannot be efficiently propagated from seeds or cuttings.

⁴⁹ BCMAF, "Deciduous Shrub Liner Production Fraser Valley." *Planning For Profit*, Fall 1996.

⁵⁰ ¹⁴ BCMAF, "One Gallon Deciduous Shrub Containers Fraser Valley." *Planning For Profit*, Fall 1996.

⁵¹ BCMAF, "Field Grown Deciduous Trees." *Planning For Profit*, Spring 1993.

⁵² *The Nursery and Landscape Industry in British Columbia*, 2002. BC Landscape & Nursery Association.

Figure 18. Whip grafted maple liners.



Some nursery catalogues list the method of propagation used for each crop. This can be very useful information for the new grower. For example, the wholesale catalogue from Monrovia Nursery does provide this type of information.

To work out a propagation protocol for a particular crop requires research and personal experience. There is considerable information available in books, trade magazines, and scientific journals. Several good references are listed in Appendix 3. The best advice is to keep detailed records so that you can repeat procedures that are successful. The International Plant Propagators' Society is an excellent resource for information, either through the proceedings they publish from their annual meetings or from discussions with members at Society events. The motto of the Society is *To Seek and To Share* and members truly do openly share information with members. Information about the Society is available on their [web site](#).

When propagating plant material it is important to be aware of any trademarks or patents that may be registered on the particular variety or cultivar being propagated. For more information on these subjects refer to the section titled *Plant Patents*.

Suppliers of Planting Stock: Once decisions have been made on the crops to produce, the next question often is where to purchase stock plants. The BCLNA's *Buyers Guide* is an excellent source for identifying suppliers. It lists the volumes, sizes, and types of crops grown at member nurseries. The *Buyers Guide* is available at no cost from the BCLNA. There is an Internet version of the guide located at Canada Nursery [website](#). An advantage of the web version is that plants can be searched by species and even by cultivar at times.

If you are purchasing stock plants for in-house asexual propagation, it is critical to ensure you are buying material that is true-to-name. It is also important to ensure the material is free of regulated pests. If a regulated pest is detected at your nursery, then the Canadian Food Inspection Agency (CFIA) will take steps to eradicate it. These actions can include prohibitions on plant movement and destruction of affected stock, which can result in lost market opportunities and serious financial hardship. The threat posed by regulated pests is very real and has been referred to as the single greatest external threat to industry operators.

In the past couple of years, several exotic pests (e.g. *Phytophthora ramorum*, Asian Longhorned Beetle, and Emerald Ash Borer) have been detected in North America and they have had a very negative impact on the ornamental industry. The finding of *Ralstonia*

solanacearum, Race 3 (Biovar 2) in the US in 2003 resulted in more than 800 greenhouses being quarantined and financial losses for the industry estimated at more than \$4 million. The detection of the pathogen in some greenhouses resulted in the entire geranium crop being destroyed, with no immediate financial compensation. In 2004, the detection of the quarantine pathogen, *Phytophthora ramorum*, at a few facilities in BC resulted in the destruction of over a \$500,000 worth of plants, and in excess of \$2.2 million in total costs for crop destruction and lost business.

Due to concerns of spreading *Phytophthora ramorum*, the organism that causes Sudden Oak Death or Ramorum Blight, the BC nursery industry implemented a voluntary *P. ramorum* certification program in 2004. The program includes annual nursery sampling and testing for *P. ramorum*, and the implementation of biosecurity, record keeping and audit procedures. The program was developed to provide growers with a method of assuring themselves, their clients, the public and Canada's trading partners that BC is not producing or selling *P. ramorum* infected plants. Providing a *P. ramorum* certification program was crucial to maintain access to the Canadian and US markets. The situation is continually changing and you are advised to check with the [CFIA](#) or the [Canadian Landscape and Nursery Association](#) for the latest requirements for wholesale nurseries.

Figure 19. Restricted access, signage and foot dips are components of nursery biosecurity.



Growers need to understand the risk associated with importing plant material and take effective action to minimize the risks. Although producers should expect clean stock from suppliers, in reality this is not always true. Producers need to implement procedures to detect pests on incoming stock and reduce the risk of spreading the pest to other crops at their operation. Some steps that can be taken to protect your nursery include:

1. **Know Your Suppliers** - Are they in or near an area that is regulated for a pest of concern? Where do they source their stock? What steps do they take to ensure their stock is clean?
2. **Isolate Crops at the Facility** - New shipments, especially from high risk areas or of high risk crops, should be isolated in a 'quarantine' area and regularly monitored for pests.
3. **Quick Detection and Action of Unknown Pests** - Monitor crops regularly, especially new stock. Be aware of regulated pests, and their symptoms and signs. Information on some of the exotic pests of concern to nursery growers are described in Chapter 1 of the

Nursery & Landscape Pest Management & Production Guide and on the Ministry's [web site](#). Immediately contact local agencies for assistance to identify a 'new' pest or disorder.

4. **Sanitation** - Off-load plant shipments at a location that can be easily cleaned; bag and discard all debris. Grow potted crops on a free-draining surface to prevent puddles and splashing. Take steps to reduce the risk of spreading pests between production areas on staff and equipment.
5. **Maintain Accurate Records on Crop Movements** - Crop movement records are required for trace-out investigations. Keep records on the product, amount, date, and the origin and/or receiver of the plants.

The recent spread of quarantine pests on planting stock has increased awareness of the importance of plant health. Standards are being developed to mitigate the risk of spreading pests on plant material. In 2005, the North American Plant Protection Organization signed into effect the [Plants for Planting Standard \(RSPM 24\)](#). An objective of the Standard is to prevent the introduction of quarantine pests into North America on plants imported from other countries. The Standard will result in mandatory certification of wholesale nursery growers in North America. Canada has agreed to implement the measures in 2010.

BUSINESS REGISTRATION AND LICENCING

Once the decision has been made to undertake a nursery business venture, one of the first details to address is what type of business structure to operate under. "From a legal point of view, there are three common types of businesses: sole proprietorship, partnership and corporation. Each has different and important implications for liability, taxation and succession."⁵³ For a discussion on the advantages and disadvantages of each refer to the [Small Business BC Education Centre website](#). It is advisable to consult a lawyer and/or accountant to determine which business structure is most suitable and to help set up the business.

Contact your local Government Agent Office or the provincial Corporate Registry for information on how and where to register or incorporate a business in your area. The Corporate Registry can be reached at (250) 387-7848 or via the [website](#).

A municipal business license may be required for each location that the business occupies, depending on whether the business sells at the wholesale or retail level, and whether the products are grown on site or shipped in from elsewhere. A business license may also be required for each municipality in which the business makes sales. Business license requirements may vary between municipalities, check with the city hall licensing department of the municipalities involved.

There is considerable information on the Internet that will be useful when setting up your business. The [Canada / British Columbia Business Services Society's website](#).

includes numerous resources for new business entrepreneurs. The business start-up section has information on business registering and licensing requirements, land use and zoning, labour requirements, and keeping business records. The site also has an interactive business planner, small business guides, e-business information and numerous links to useful government sites.

The One Stop Business Services site is an excellent source for details on starting a new business, and business registration and licensing. Once you have your business registered provincially, enter the one stop business registration service to register for the other government registrations you need: GST, PST, Canada Revenue Agency, WorkSafeBC coverage, and municipal license. You must complete a company name search before you can apply for these government registrations.

One Stop Business Service Centres are located throughout the province, see the [website](#) for locations.

INSURANCE COVERAGE

Insurance coverage beyond WorkSafeBC is another area to consider. Private insurers can provide customized insurance plans to meet your needs. The plan may include farm, greenhouse, liability, life, and other types of insurance coverage.

Weather can damage a crop or make it unmarketable. Insurance against weather-related crop loss is provided by the government-run Production Insurance program in BC. See [website](#) for information. At this time, the program does not provide coverage for any nursery crops.

⁵³ [Online Small Business Workshop](#).

The Canadian Agricultural Income Stabilization (CAIS) Program is a joint federal/provincial/territorial business risk management program that provides disaster protection. CAIS helps producers to protect their farming operations from both small and large drops in income. A farm will receive a payment from CAIS when their current year farm income is less than their average farm income from previous years. The amount of support received is based on the level of protection chosen. The program is a whole-farm program available to eligible farmers regardless of the commodities they produce.

ROLES OF INDUSTRY ASSOCIATIONS

There is a network of agricultural industry associations which provide various forms of representation for the BC nursery industry. The following list progresses from the local grassroots level through to the national organizations.

LANDSCAPE AND NURSERY ONLY

BC Landscape & Nursery Association (BCLNA): The BCLNA has more than 600 members, representing three commodities: wholesale nursery, retail nursery/garden centre; and landscape professionals. It also includes as members the industry's educators, suppliers, consultants and affiliated government agencies.

The organization was formed in 1953 and is today a strong organization, providing a forum for companies with shared interests and concerns to work together on local, regional and provincial issues. Individual companies may contact the BCLNA for a listing of membership services and benefits.

Canadian Nursery Landscape Association (CNLA): Individual companies can join the CNLA only by becoming a member of a provincial nursery association, such as the BCLNA. The CNLA, which counts as members all the provincial associations, represents the nursery industry on all national issues. It also provides a wide range of membership benefits. Please contact the BCLNA for information.

PAN-HORTICULTURE

Canadian Horticulture Council: The nursery industry is represented in this national organization through the CNLA. Representing a cross-section of Canadian horticultural organizations, it includes in its membership individual provincial organizations as well as umbrella groups like CNLA. For more information on the Council, see their [website](#).

PAN-AGRICULTURE

BC Agriculture Council: The BCAC is the provincial "umbrella" organization for agriculture. Individual farm organizations (like the BCLNA) are members through their association. Its objective is to provide an efficient and effective voice for those issues which impact on all of BC agriculture. For more information on BCAC, review their [website](#).

Canadian Federation of Agriculture: This organization, like the CHC, includes both individual and umbrella groups from across Canada. It provides a voice for pan-Canadian agricultural issues.

APPENDIX 1 - Regulations

There are numerous municipal, federal, and provincial acts and bylaws that regulate what you can do on your farm. Below is some information on a few regulations that should be considered when setting up a nursery. This is not an all inclusive listing.

FEDERAL REGULATIONS

Customs Act: The Act governs the importation and exportation of goods in and out of Canada. The Act also regulates the transportation, movement and storage of goods. A certificate of origin is required for all goods being imported into Canada and goods being exported to the US. For detailed information on the required documentation for import and export shipments, visit the importsource.ca or exportsource.ca website. There is a toll-free information line for exporters at 1-888-811-1119.

Excise Tax Act (GST): Legislates taxes payable on goods and services sold within Canada (Goods and Services Tax). Individuals or businesses operating in Canada with worldwide annual revenues from taxable supplies of goods and services over \$30,000 are required to register for GST with the Canada Revenue Agency (CRA), and collect and remit GST on sales made within Canada. Registration is voluntary for business with annual revenue below \$30,000 but may be beneficial in order to receive input tax credits on business purchases made. For more information on GST registration contact the CRA at 1-800-959-5525, or [online](#).

Fisheries Act: The Fisheries Act is federal legislation established to protect Canada's fisheries resources and supporting habitats. It applies to all Canadian waters, including ditches, streams, marshes, rivers, lakes, estuaries, coastal waters and marine offshore areas. The Act also applies to seasonally wetted fish habitat such as shorelines, stream banks, flood plains, intermittent tributaries and privately owned land.

The habitat protection provisions of the Fisheries Act are of particular interest to farmers. These sections prescribe that no one may carry out a work or undertaking that results in a harmful alteration, disruption or destruction of fish habitat, unless it has been authorized by Department of Fisheries and Oceans (DFO). The Act also prohibits the deposit of harmful substances into waters containing fish, such as fertilizers, pesticides, manure, sediment, etc.

Farmers should contact DFO before working in any watercourse to help determine the requirements that may apply to a specific project. To locate the DFO office nearest you refer to the blue pages of your local telephone directory under Fisheries and Oceans Canada.

Migratory Birds Convention Act: This Act is designed to protect migratory birds that inhabit Canada during part or all of the year. There are provisions in the Act covering when and where birds may not be killed or captured or their nests or eggs disturbed.

Although migratory birds may damage agricultural lands, it is an offence under the Act to release substances which may harm them.

Pest Control Products Act: The intent of the Act is to ensure the safety, merit and value of pest control products used in Canada. It focuses on the protection of human health and the environment, and product performance.

Under the Act, a control product is defined as any product, device, organism or substance that is manufactured, represented, sold or used to control, prevent, destroy, mitigate, repel or

attract pests. The term pest includes any injurious, noxious or troublesome insect, fungus, bacterial organism, virus, weed, rodent or other plant or animal pest. Products regulated under the Act include herbicides, fungicides, insecticides, biological agents such as bacteria and viruses, antimicrobial agents, growth regulators, wood preservatives and water purification products.

All pest control products used or imported into Canada must be registered in Canada.

Plant Breeders' Rights Act: Governs the rights to propagate, or sell for the purpose of propagation, new varieties and cultivars of plant material that have been registered with the Plant Breeders' Rights Office, for a period of up to 18 years. For specific information on which cultivars or varieties are protected by the Act contact the Canadian Ornamental Plant Foundation.

Plant Protection Act: The purpose of this Act is to protect plant life and the agriculture and forestry industries by preventing the importation, exportation and spread of injurious pests and by providing for their control and eradication as well as the certification of plants and other things.

Regulations under the Act restrict the movement of plant material worldwide. There are also provincial acts that regulate the movement of nursery stock to prevent the spread of pests. The *BC Nursery & Landscape Pest Management & Production Guide* provides information on plants that have movement restrictions due to the provincial and federal regulations. Contact the [Canadian Food Inspection Agency](#) (CFIA) for more information about movement restrictions and phytosanitary requirements of nursery stock.

Domestic Shipments - Some areas in Canada are classified as a 'regulated region', due to the presence of a regulated pest. Nursery stock to be shipped from a regulated to a non-regulated area requires a domestic movement certificate. A certificate is issued based on an inspection of the stock by the CFIA. For some regulated pests, there are specific management practices that must be implemented for stock to qualify for a movement certificate.

Export Shipments - A phytosanitary certificate from the CFIA is required for all export shipments. This document is an assurance that the plants are free of quarantine pests and substantially free of other pests. Export certification is a quarantine requirement of importing countries.

Import Shipments - An import permit is required to import nursery stock into Canada from any country, with the exception of the continental US. An import permit is required for nursery stock from the continental US only where there are specific quarantine regulations governing their movement. Permits are often issued for a three year period. Permit application forms are available from the CFIA. A phytosanitary certificate issued by the exporting country is required in most cases, as described above.

The Act also provides for the monitoring of pests. It obligates anyone discovering a pest, in an area where the pest has not previously been known to exist, to notify Agriculture and Agri-Food Canada immediately and provide a specimen of the pest.

PROVINCIAL REGULATIONS

Assessment Act: BC Assessment is responsible for classifying and determining the market value of all properties in British Columbia. This information is used by taxing authorities to set property taxes.

Property taxes are usually based on market value. However, the value of farm land (Class 9 land) is based on agricultural productivity of the land. Land productivity is calculated from a commissioner rate formula. Based on this formula, the maximum value of 'farm class' land is about \$10,000/ha, which is well below the market value. Therefore, the farm land classification significantly reduces the property taxes assessed.

To be classified as farm land, the property must produce primary agricultural products for sale such as a crop or livestock. Classification of farm status of an operation is made by the BC Assessment on the basis of land area and annual gross income from primary production.

Contact the BC Assessment Authority (in the white pages of your telephone directory) for information on obtaining farm class status. The BC Assessment Authority can also be reached on the [Internet](#):

Commercial Transport Act: Covers the registration, licensing and operation of commercial vehicles. Its goal is to ensure public safety. Provisions under the Act cover vehicle and load size, weight, projections and overhangs. Under the Act, the police and appointed inspectors can prohibit the operation of any vehicle they feel is unsafe.

Drainage, Ditch and Dyke Act: Establishes a system for the regulation and authorization of ditches, watercourses, drainages, and dykes throughout the province.

Drinking Water Protection Act: Prohibits contaminating drinking water by introducing or causing anything to be introduced into a domestic water system, a drinking water source, a well recharge zone or an area adjacent to a drinking water source.

Electrical Safety Act: Outlines the duties and responsibilities of owners and occupiers of structures in which electrical equipment is used. It also outlines what is required of contractors and employees designing, installing, testing and using electrical equipment.

Employment Standards Act: Governs payment of wages, hours of work, breaks, and termination of employees, and employers' record keeping obligations. A guide to the Employment Standards Act is available from the [Ministry of Skills Development and Labour, Employment Standards branch website](#).

Employment Standards Inquiries:

Ministry of Skills Development and Labour
PO Box 9594
Stn Prov Govt
Victoria, BC
V8W 9K4
Tel: (250) 356-1487
General inquiries
Toll Free: (800) 663-3316
(250) 612-4100 in the Prince George area

Environmental Management Act: The Act is responsible for controlling pollution in BC. The Act defines pollution as “the presence in the environment of substances or contaminants that substantially alter or impair the usefulness of the environment”. Under the Act, agricultural waste must not be directly discharged into a watercourse or ground water. Regulations in the Act also address specific issues including agricultural waste control, open burning smoke control, compost production and use, petroleum storage, chemical waste control, and spill reporting.

If agricultural wastes are handled on the farm in accordance with the [Code of Agricultural Practice of Waste Management](#), the operation is exempt from holding a waste management permit.

The *Environmental Farm Plan Reference Guide* supports the Code, and provides the industry with various options for managing farms in an environmentally sound manner, without contravening Federal or Provincial environmental laws or regulations.

Farm Practices Protection (Right to Farm) Act: The fundamental policy of the Act is that farmers have a right to farm in BC, particularly in the Agricultural Land Reserve, provided they use ‘normal farm practices’ and follow other legislation listed in the Act. The Act stipulates that farm operations must abide by regulations in the Health Act, Pesticide Control Act, and Waste Management Act.

The Act also amends the Municipal Act and Land Title Act to encourage local governments to support farming by ensuring local bylaws reflect provincial standards for farming.

The Act also establishes an improved complaint resolution process for people who live near farms and have concerns about farm practices which create dust, odour, noise or other disturbances.

Fish Protection Act: Fish and fish habitat are protected by rules established in relation to water licenses on “sensitive streams” where the sustainability of fish habitat is at risk. The Act allows the provincial government to establish directives for local governments in preserving streamside areas from residential, commercial and industrial development.

Health Act: Safeguarding the health of British Columbians is the focus of this Act. The Act regulates farm practices that may result in a health hazard. Such hazards can occur when nutrients, contaminants or pathogens are discharged into or on to land, water or air. Ref use, unpurified sewage, and other substances may not be discharged to the environment.

Specific regulations cover removal of health hazards, sanitation standards in public buildings, ventilation, sewage handling, and water and food safety. Agritourism and destination nursery businesses also need to consider the Act’s regulations concerning food service facilities that may be part of the operation.

Highway Act: The purposes of this Act are to ensure travel on highways is safe and to protect BC’s transportation infrastructure. Under the Act, it is an offence to place or leave any material on public roads. This includes offensive substances (such as mud or manure), containers, and other debris.

Signs and mail boxes cannot be erected without a permit from the BC Ministry of Transportation and Highways. To obtain a sign, a roadside vendor must provide safe access and sufficient parking. Lights which distract motorists are forbidden.

Ditches, culverts, or flumes cannot be changed or installed without permission. The ministry may impose load restrictions limiting the size and weight of agricultural vehicles on certain roads.

Motor Vehicle Act: The purpose of the Act is to protect people traveling on public roads. Specific provisions cover the movement of farm equipment on public roads. Farmers may drive, propel, draw and move implements of husbandry on certain roads. They may also carry farm products, supplies, stock, fertilizer, seed, and tools in trailers. Slow moving vehicles may not impede other traffic.

The Act regulates the distance at which signs can be erected from highways in rural areas of British Columbia, as well as light emissions and reflections which may affect visibility on the highway. Other provisions cover the parking of vehicles along highways and the use of vehicles along highways to sell produce.

Specific regulations cover the location of cattleguards, fences and gates.

Under the Act it is an offence to dump or deposit any “noisome, noxious or offensive matter” on a highway or right-of-way.

Integrated Pest Management Act: This Act establishes a regulatory regime for the control of pesticides. The Ministry of Environment is responsible to license and certify sales, purchases and the use of pesticides in the Province. The Act also regulates storage, disposition and transportation of pesticides. Applicators and sellers of pesticides are required to undergo training and certification. To obtain a certificate you must pass the provincial Pesticide Applicator Exam. Courses are offered at some community colleges to prepare applicants for the exam, and study kits including reading material and videos are available for learning the exam material.

For information on how to apply to write the Pesticide Applicators exam, in Greater Vancouver contact Kwantlen University College, Assessment and Testing Service at (604) 599-3100 or toll free at (877) 272-7122. Outside Greater Vancouver, contact Administrator, Pesticide Examinations, Government Agent Office in Nelson at (250) 354-6585 or toll free at (866) 205-2102. Courses are currently offered at: Kwantlen University College, University College of the Fraser Valley, and other select locations.

Plant Protection Act: The Act provides for the prevention of the spread of pests destructive to plants in British Columbia. It gives inspectors the power to enforce provisions in the Act, including the establishment of quarantine areas. This Act is the provincial counterpart to the federal Plant Protection Act. The BC Plant Protection Advisory Council helps enforce the Act by advising provincial and federal officials of potential insect, plant disease, weed and other hazards.

Safety Standards Act: The purpose of this Act is to ensure boiler and pressure vessel safety in British Columbia. The Act outlines the responsibilities of boiler, pressure vessel and refrigeration equipment owners and qualifications needed by personnel operating it. Specific regulations cover the design, construction, installation, inspection, operation, condition, alteration maintenance, transportation, repair, testing, sale and exchange of boilers, pressure vessels, pressure piping, fittings and refrigeration equipment.

Social Services Tax Act: Social Services Tax, or PST, is applicable to most products sold in the province of BC. Any business selling taxable goods at retail is required to register as a vendor with the Consumer Taxation Branch, Ministry of Finance and Corporate Relations, and collect

and remit social service tax (retail sales tax) on taxable sales. For more information and to register as a vendor contact:

Ministry of Finance and Corporate Relations
Consumer Taxation Branch, Vancouver
500-605 Robson Street
Vancouver, BC V6B 5J3
Tel: (604) 660-4524
Fax: (604) 660-1104
[Website](#)

In BC, bona fide farmers are exempt from paying social services tax on certain purchases intended for farm use. Tax exemptions include supplies, such as fertilizer, growing medium and fuel, and purchases of capital assets such as tree diggers and irrigation equipment.

Coloured fuel and propane may be purchased PST exempt for vehicles used entirely for farm business use. A Family Farm Truck Emblem may be obtained to purchase PST exempt fuel for vehicles that are used for farm and restricted personal use.

For a complete list of tax exempt nursery purchases and details on obtaining a Family Farm Truck Emblem refer to the Ministry of Provincial Revenue's bulletin SST 023 - Bona Fide Farmers: Social Service Tax Act, Motor Fuel Tax Act, and bulletin SST 088, Greenhouses, Nurseries, and Garden Stores, available [online](#) at or call the Consumer Taxation Branch toll free at (877) 388-4440 (604 660-4524 in Vancouver area) to receive a copy by fax or mail.

BC Farm Identity Card - To claim farmers' provincial sales tax exemption, farm businesses must obtain a BC Farm Identity Card which identifies them as a bona fide farmer. A "bona fide farmer" means a person who holds or leases land classified as farm land under the provisions of the Assessment Act of BC. Once bona fide farmer status has been established, a refund may also be obtained for tax paid on applicable farm purchases for the previous two years.

All bona fide BC farmers are eligible for the BC Farmer Identity Card. For details on how to obtain a BC Farmer Identity Card contact the BC Agriculture Council. The Council also has an information page and application form [online](#).

Soil Conservation Act: The Act is intended to protect soil on land in the Agricultural Land Reserve by regulating its removal and the placement of fill. Removal or deposit of fill on land requires the approval of the local government authority and a permit from the Agricultural Land Commission. The Commission sets terms and conditions on the quantities of earth involved, how the work is to be undertaken, and the restoration required to return the land to a condition fit and suitable for agriculture.

Transport of Dangerous Goods Act: Establishes requirements to provide for the safe transport of goods deemed to be dangerous. Under the Act, all safety requirements must be met and all dangerous goods and vehicles transporting dangerous goods must be appropriately marked. Regulations specify which substances and organisms are dangerous and establish classes of dangerous goods. They are: (1) explosives, (2) gasses, (3) flammable and combustible liquids, (4) flammable solids, (5) oxidizing substances, (6) poisonous and infectious substances, (7) radioactive materials, (8) corrosives, and (9) miscellaneous products, substances or organisms dangerous to life, health, property or the environment.

Weed Control Act: The purpose of the Act is to protect our natural resources and industry from the negative impacts of noxious weeds. It is an offense under the Act to sell nursery stock that contains a noxious weed, or a propagative part of a noxious weed.

Worker's Compensation Act: The Industrial Health & Safety Regulations of the WCB cover a broad range of issues regarding worker safety. A requirement of the regulations is the implementation of an industrial health and safety program at the workplace.

Four sets of health and safety regulations cover BC companies, large and small:

- a) Occupational Health and Safety Regulations establish minimum health and safety requirements.
- b) WCB Occupational First Aid Regulations outline the first aid services and equipment employers must provide.
- c) Workplace Hazardous Materials Information System regulations cover hazardous substances and the information that must be provided.
- d) Occupational Environment Regulations cover work conditions such as illumination, atmospheric contaminants and ventilation in factories, shops and offices.

Registration is required for all employers and a premium is payable based on wages and an assessed rate to provide WCB insurance coverage for workers. Individuals operating as a proprietorship are not required to register with WCB but may opt for the Optional Personal Protection.

The [Farm and Ranch Safety and Health Association](#) (FARSHA) will assist producers to follow BC's Occupational Health and Safety Regulations for Agriculture. FARSHA is a non-profit organization that is dedicated to reduce the incidence of injuries and accidents on BC farms and ranches. They also provide resource materials, presentations, assistance in establishing safety committees, and on-site health and safety reviews.

Water Act: This Act creates a system for the regulation of the Province's fresh water systems. A license must be obtained before using, storing or diverting surface water or making changes in or about a stream.

MUNICIPAL REGULATIONS

Municipalities have bylaws to deal with greenhouse site coverage, building codes, woodwaste deposition, storm water management plans, boiler emissions, and setbacks from property lines and water courses.

Municipalities also have zoning bylaws that restrict the type of development permitted on a parcel of land. While checking on the zoning of property you are interested in purchasing, inquire about future municipal plans for the area. Plans for large roadways or subdivisions may already be in the works.

Contact the municipal government for more specific information on bylaws that will pertain to your nursery.

APPENDIX 2 - Industry Contacts

Government

BC Assessment

Email: info@bcassessment.ca

Website: <http://www.bcasessment.bc.ca/>

BC Ministry of Agriculture and Lands Industry Specialist, Ornamentals

1767 Angus Campbell Road
Abbotsford, BC

V3G 2M3

Tel: (604) 556-3044

Fax: (604) 556-3080

Email: david.woodske@gov.bc.ca

Website:

<http://www.agf.gov.bc.ca/ornamentals/index.htm>

Canada / British Columbia Business Services Society

601 West Cordova Street
Vancouver, British Columbia,
Canada V6B 1G1

Phone: (604) 775 5525

Toll Free: (800) 667-2272

Fax: (604) 775-5520

Email: askus@cbssc.ic.gc.ca

Website: www.smallbusinessbc.ca/

Canadian Food Inspection Agency, Operations Directorate

Burnaby

Tel: (604) 666-2891

Fax: (604) 666-8577

Victoria

Tel: (250) 363-3618

Fax: (250) 363-0144

Kelowna

Tel: (250) 470-4884

Fax: (250) 470-4899

Check your local phone directory for
other CFIA offices.

Email: cfiamaster@inspection.gc.ca

Website: <http://www.inspection.gc.ca/>

Plant Breeders' Rights Office

Canadian Food Inspection Agency
59 Camelot Drive

Ottawa, ON

K1A 0Y9

Tel: (613) 225-2342

Fax: (613) 228-6629

Email: vsisson@inspection.gc.ca

Website:

www.inspection.gc.ca/english/plaveg/pbr/pov/pbrpove.shtml

Associations/Societies

BC Agricultural Council

#102 - 1482 Springfield Road

Kelowna, BC V1Y 5V3

Phone: (250) 763-9790

Fax: (250) 762-2997

Email: bcac@bcagcouncil.com

Website: <http://www.bcac.bc.ca/>

British Columbia Landscape & Nursery Association

#102 - 5783 176A Street

Surrey, BC

V3S 6S6

Tel: (604) 574-7772

Fax: (604) 574-7773

Toll Free: 1-800-421-7963

Email: bcnainfo@telus.net

Website: www.canadanursery.com/

Canadian Christmas Tree Growers' Association

P.O. Box 996, Station "B"

59 Sparks Street

Ottawa, Ontario

K1P 5R1

Tel: (819) 682-8444

Email: marcgaudet@sympatico.ca

The Canadian Federation of Agriculture

75 Albert Street, Suite 1101

Ottawa, Ontario K1P 5E7

Tel: (613) 236-3633

Fax: (613) 236-5749

Email: info@cfafca.ca

Website: <http://www.cfa-fca.ca/pages/home.php>

Canadian Horticultural Council
9 Corvus Court
Ottawa, Ontario K2E 7Z4
Tel: (613) 226-4880
Fax: (613) 226-4497
Email: webmaster@hortcouncil.ca
Website:
<http://www.hortcouncil.ca/chcmain.htm>

Canadian Ornamental Plant Foundation
Box 21083 RPO Algonquin
North Bay, Ontario P1B 9N8
Tel: (800) 265-1629
Fax: (705) 495-2563
Website: <http://www.copf.org/>

Farm and Ranch Safety & Health Association (FARSHA)
\$311, 9440 – 202 St
Langley, BC
V1M 4A6
Tel: (604) 881-6078
Toll Free: (877) 533-1789
Fax: (604) 881-6079
Email: farmsafe@farsha.bc.ca
Website: <http://www.farsha.bc.ca/>

International Plant Propagators' Society, Inc., Western Region
Email: ippswrlee@sbcglobal.net
Website: <http://www.ipps.org/Westernna/>

Irrigation Industry Association of BC (IIABC)
2330 Woodstock Drive
Abbotsford, BC V3G 2E5
Phone/Fax: (604) 859-8222

Landscape Alberta Nursery Trades Association
10215 - 176 Street
Edmonton, Alberta
T5S 1M1
Tel: (780) 489-1991
Fax: (780) 444-2152
Email: info@landscape-alberta.com
Website: <http://www.landscape-alberta.com/flash.html>

Landscape Ontario
7856 Fifth Line South, RR 4
Milton, Ontario
L9T 2X8
Tel: (905) 875-1805
Fax: (905) 875-3942
Email: lo@horttrades.com
Website:
<http://www.landscapeontario.com/>

Native Plant Society of British Columbia
2012 William Street
Vancouver, BC V5L 2X6
Website: <http://www.npsbc.org/>

Oregon Association of Nurseries
29751 SW Town Center Loop W
Wilsonville, OR 97070
Tel: (503) 682-5089
Fax: (503) 682-5099
Email: info@oan.org
Website: <http://www.oan.org/>

Pacific Northwest Christmas Tree Association
P.O. Box 3366, Salem, Oregon 97302
Tel: (503) 364-2942
Fax: (503) 581-6819
Website: <http://nwtrees.com/about2.htm>

Perennial Plant Association
3383 Schirtzinger Road
Hilliard, Ohio, USA
43026
Tel: (614) 771-8431
Fax: (614) 876-5238
Email: ppa@perennialplant.org
Website: <http://www.perennialplant.org/>

Southwest BC Christmas Tree Association
Mike Fleming
Tel: (250) 428-3228
Fax: (250) 652-3345
Email: info@bcchristmastrees.com
Website:
<http://www.bccchristmastrees.com/swbccta/retail.htm>

Laboratories

Plant Diagnostic Services

BC Ministry of Agriculture & Lands

Plant Diagnostic Laboratory
1767 Angus Campbell Road
Abbotsford, BC V3G 2M3
Tel: (604) 556-3126 / Toll Free: (888)
661-9903
Fax: (604) 556-3154
Website:
www.agf.gov.bc.ca/cropprot/lab.htm

Phyto Diagnostics (virus testing only)

9381 Ardmore Drive
North Saanich, BC V8L 5G4
Tel: (250) 655-1444 / Fax: (250) 655-
3115
Email: info@phytodiagnosics.com
Website:
<http://www.phytodiagnosics.com/>

Soil, Tissue and Water Analysis Services

Griffin Laboratories Corp.

#2 - 2550 Acland Road
Kelowna, BC V1X 7L4
Tel: (250) 765-3399 / Toll Free: (800)
661-2339
Fax: (250) 765-3556

Grotek Analytical Lab

9850 - 201 Street
Langley, BC V1M 4A3
Tel: (604) 882-7686
Fax: (604) 882-7659
Email: info@grotek.net
Website: www.grotek.net

Norwest Labs

#104, 19575 - 55A Avenue
Surrey, BC V3A 8P8
Tel: (604) 514-3322 / Toll Free: (800)
889-1433
Fax: (604) 514-3323
Email: info@norwestlabs.com or
Surrey@norwestlabs.com
Website: www.norwestlabs.com

Pacific Soil Analysis

#5 - 11720 Voyageur Way
Richmond, BC V6X 3G9
Tel: (604) 273-8226 / Fax: (604) 273-
8082
Email: cedora19@aol.com

Marketing

BC Association of Farmers' Markets

c/o Bertie Wells
455B Alexander Avenue
Kamloops, BC V2B 3R5
Email:
BCAFM_executivedirector@shaw.ca

Fraser Valley Farm Direct Marketing Association

Box 327
#800 - 15355 - 24th Avenue
White Rock, BC
V4A 2H9
Tel: (604) 535-5282
Fax: (604) 535-9610
Website: <http://www.bcfarmfresh.com/>

Saanich Peninsula Direct Farm Marketing Association

304 Walton Place,
Victoria BC
V8X 3X1
Tel: (250) 658-5888

Southern Vancouver Island Direct Farm Marketing Association

Box 235
Saanichton, BC V8M 2C3
Tel: (250) 544-0941
Fax: (250) 544-0942
Email: info@islandfarmfresh.com
Website:
<http://www.islandfarmfresh.com/>

E-Business Connection c/o Canada/BC Business Services Society

A BC-based, not-for-profit e-business resource centre for small businesses in BC.

Suite 82, 601 West Cordova Street
Vancouver, BC V6B 1G1
Tel: (604) 775-7532
E-mail: info@e-bc.ca
Website: <http://e-bc.ca>

Mail-order Gardening Association

5836 Rockburn Woods Way
Elkridge, MD 21075
Tel: (410) 540-9830
Fax: (410) 540-9827
Email: info@mailordergardening.com
Website:
<http://www.mailordergardening.com/>

National Mail Order Association

2807 Polk St.
NE Minneapolis, MN 55418-2954
Tel: (612) 788-1673
Fax: (612) 788-1147
E-mail: info@nmoa.org
Website: <http://www.nmoa.org/>

Consultants *Contact the BC Landscape and Nursery Association for a listing of nursery consultants.*

APPENDIX 3 - Sources of Information

Publications

The BCMAL launched a new Internet information portal, InfoBasket, in March 2001. InfoBasket was developed to make it easier for clients to access information on the Internet. The site is a one-stop shop for information on production & processing, business management and finance, marketing and trade, regulations and legislation, directories and contacts, and statistics and market data.

The Ministry is acting as an information broker through the site, linking clients to relevant information on Internet sites from government, industry associations, educational/research institutions, and other relevant sites worldwide. All of the material on the site is selected by Ministry staff, which provides an advantage over other public search engines. The new information portal is available at [InfoBasket website](#).

There are numerous Internet sites that have catalogues of useful nursery publications, including:

- [American Nurseryman Publishing Co.](#)
- [Canadian Forest Service](#)
- [Iowa State University Weed Identification Resources](#)
- [NHBS Environment Bookstore](#)
- [Oregon State University Extension and Experiment Station](#)
- [Timber Press](#)
- [Washington State University Cooperative Extension](#)
- ^{BCLNA} Indicates publications that are available from the BC Landscape and Nursery Association.

^{MAL} Indicates publications that are available from the BC Ministry of Agriculture and Lands.

BUSINESS MANAGEMENT/MARKETING

^{BCLNA} *BC's Nursery Industry Competitiveness Study*, April 1997. McTavish and Jarvis, BC Nursery Trades Association

^{BCLNA} *British Columbia Garden Products and Services Consumer Survey*, February 1999. McTavish Resource & Management Consultants Ltd. and J. Jarvis & Associates

Establishing and Operating a Garden Center, 2002. S. Barton, Editor. Natural Resource, Agriculture, and Engineering Service ISBN: 0-935817-86-7

Green Profit on Retailing, 2000. R. Blanchette and J. VanderVelde, Editors. Ball Publishing ISBN: 1-883052-22-X

Greenhouse Operation and Management, 2002. P.V. Nelson. Prentice Hall ISBN: 0-13-010577-5

How to Make Money Growing Plants, Trees and Flowers, 2000. Francis X. Jozwik. Andmar Press

^{BCLNA} *Nursery Export Development Business Plan*, October 1998. J. Jarvis & Associates and McTavish Resource & Management Consultants Ltd.

Nursery & Garden Center Management, Second Edition, A Teaching Manual, 1990. Susan Barton, Editor. University of Delaware, Cooperative Extension, Townsend Hall, Newark, DE, 19717-1303

^{BCLNA} *Preparing a Business Plan for Wholesale Nurseries*, February 1995. J. Jarvis & Associates

[Preparing a Business Plan: a Guide to Agricultural Producers: Wholesale Nursery Example, 1996](#). Pat Davidson. BCMAFF & BC Nursery Trades Association.

^{BCLNA} *Study of Financial Reporting in the BC Nursery Industry*, March 1998. J. Jarvis & Associates

^{BCLNA} *Survey and Analysis of BC Retail Nursery & Garden Centre In-Store POS Marketing*, April 1999. McTavish Resource & Management Consultants Ltd.

The Complete Guide to Garden Center Management, 2002. J. Stanley. Ball Publishing ISBN: 1-883052-31-9

^{BCLNA} *The Nursery and Landscape Industry in British Columbia*, 2002. Prepared by KPMG LLP for the BC Landscape and Nursery Association

GREENHOUSE STRUCTURES

Ball RedBook, Vol. 1: Greenhouses and Equipment. Chris Beytes, Editor. Ball Publishing ISBN: 1-883052-25-4

Computerized Environmental Control in Greenhouses, 2002. P. G. H. Kamp and G. J. Timmerman. Ball Publishing ISBN: 90-75627-01-7264

Greenhouse Engineering, 1994. Robert A. Aldrich and John W. Bartok. NRAES-33 ISBN: 0-935817-57-3

GrowerTalks on Structures and Equipment, 2001. R. Blanchette, Editor. Ball Publishing ISBN: 1-883052-29-7

IRRIGATION

BC Frost Protection Guide, 1988. Ted W. Van Der Gulik & Rick J. Williams. Irrigation Industry Association of British Columbia & BC Ministry of Agriculture, Fisheries & Food

BC Sprinkler Irrigation Manual. Ted W. Van der Gulik. Irrigation Industry Association of BC & BC Ministry of Agriculture, Fisheries & Food

BC Trickle Irrigation Manual, 1999. Ted W. Van der Gulik. BC Ministry of Agriculture & Food and Irrigation Industry Association of BC (available from the IIABC)

Chemigation - Guidelines for British Columbia, 1993. Ted W. Van Der Gulik. BC Ministry of Agriculture, Fisheries & Food and Irrigation Industry Association of BC

^{MAL} *A wide range of irrigation factsheets are available from the Resource Management Branch of the BC Ministry of Agriculture & Food:*

- 552.000-3 Trickle Irrigation Design Information, 1988
- 575.340-1 Efficient Installation of a Centrifugal Pump, 1982
- 577.130-1 Irrigation System Maintenance, 1994
- 578.130-1 Irrigation System Cross Connection Control, 1985
- 551.200-2 Irrigation Parameters for Efficient System Operation, 1988
- 501.400-1 Irrigation Flow Measurements, 1976
- 580.200-1 Irrigation Equipment Costs, 1994

- 550.000-1 Preparing a Farm Irrigation Plan, 1985
- 551.200-2 Irrigation Parameters for Efficient System Operation, 1988
- 565.230-1 Trickle Irrigation Design Information, 1987
- 580.000-3 Irrigation Economics, 2000
- 502.100-4 Understanding an Irrigation Water License, 1996
- 512.000-2 Treatment of Greenhouse Recirculation Water (Bio-Sand Filtration), 1999
- 670.100-1 BC Frost Protection Guide, 1988 (\$5.00)

NURSERY CROP PRODUCTION

Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines, 3rd Ed., 1998. Harris et al. Prentice-Hall Inc. ISBN: 0133866653

Ball Perennial Manual- Propagation and Production, 1996. J. Nau. Ball Publishing ISBN: 1-883052-10-6

^{BCLNA} *BC Landscape Standard*, 2001. 6th Edition, BC Society of Landscape Architects and BC Landscape & Nursery Association

Container Nursery Design, 1986. American Nurseryman Publishing Co. Ltd., 77 W. Washington St. Suite 2100, Chicago, IL, 60602-2904 [website](#)

^{MAL} *Environmental Guidelines for the Nursery and Turf Industry in British Columbia*, 1994. BC Ministry of Agriculture & Food, Resource Management Branch, Abbotsford, BC

Environmental Farm Plan Reference Guide, 2003. BC Ministry of Agriculture, Fisheries and Food & Agriculture Council of BC

Nursery Management, Administration & Culture, 4th Ed., 2000. H. Davidson, R. Mecklenburg & C. Peterson. Prentice-Hall Canada, Inc. ISBN: 0138579962

Nursery Production, 2nd Ed., 1989. Heuser and Stinson, Editors. Pennsylvania State University, Rm. 112 Agric. Administration Bldg., University Park, PA 16802

Plant Production in Containers II, 2003. C. E. Whitcomb. Lacebark Publications Inc., Rt. 5, Box 174, Stillwater, OK, 74074. ISBN: 0-9613109-6-0

Production of Landscape Plants II (In the Field), 2001. C.E. Whitcomb. Lacebark Publications Inc., Stillwater, OK

So You Want to Start a Nursery, 2003. Tony Avent. Timber Press ISBN: 0-88192-584-5

^{BCLNA} *Systems for Success*, 1996. Dwight Hughes, Jr. Dwight Hughes Systems Inc., Cedar Rapids, Iowa

Tips on Growing Potted Perennials and Biennials, 766, Ohio Cooperative Extension Service, The Ohio State University, Columbus, OH

Understanding pH Management for Container-Grown Crops, 2002. William R. Argo and Paul R. Fisher. Ball Publishing ([order online](#))

PEST CONTROL

General

Christmas Tree Diseases, Insects and Disorders in the Pacific Northwest, 1997. Chastagner (editor). Washington State University Cooperative Extension, Pullman, WA;

MISC0186. Contact WSU Bulletin Office, 1-800-723-1763, or online at: caheinfo.wsu.edu.

How to Identify Rhododendron and Azalea Problems, 1993. Antonelli *et al.*, Washington State University Cooperative Extension, Pullman, WA

^{BCLNA} *Nursery & Landscape Pest Management & Production Guide*, 2002. BCMAFF and BC Landscape & Nursery Association

Pacific Northwest Plant Disease, Insect and Weed Control Handbooks. Revised annually. Oregon State University Extension Service (available online at: pnwpest.org/pnw/insects or pnwpest.org/pnw/weeds/)

Diseases

A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas, 2nd edition, 1994. N.P. Matheny & J. R. Clark. International Society of Arboriculture, PO Box GG, Savoy, IL, 61874-9902 ([available online](#))

Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines, 3rd Ed., 1998. Harris *et al.* Prentice-Hall Inc. ISBN: 0133866653

American Phytopathological Society (APS) Disease Compendia (Conifers, Roses, Ornamental Foliage Plants, and other titles), [order online from APS](#).

Common Tree Diseases of British Columbia, 1996. Allen, Morrison and Wallis. Canadian Forest Service, Victoria, BC; Phone: (250) 363-0600, Fax: (250) 363-0775, [Order Online](#).

Diseases of Annuals and Perennials: A Ball Guide, 1995. A.R. Chase, Margery Daughtrey, and Gary W. Simone. Ball Publishing ISBN: 1-883052-08-4, [Order online](#).

Diseases of Populus in British Columbia: A Diagnostic Manual, 1998. B. Callan. Canadian Forest Service, Victoria, BC; Phone: (250) 363-0600, Fax: (250) 363-0775, [Order Online](#).

Diseases of Shade Trees, 1989. T.A. Tattar. Academic Press Inc., NY ISBN: 0126843511

Diseases of Trees & Shrubs: A Color Diagnostic Guide, 1994. Ash, Draper, Lamey & Gallenberg. Minnesota Extension Service Publication #FO-6426-S

Diseases of Trees and Shrubs, 2nd Edition. Sinclair, Lyon and Johnson. Cornell Univ. Press, 124 Roberts Place, Ithaca, NY, 14850 ISBN: 080144371-7

Diseases of Woody Ornamentals and Trees in Nurseries, 2001. Jones and Benson. American Phytopathological Society, St. Paul, MN ISBN: 0-89054-264-3

Field & Laboratory Guide to Tree Pathology, 1997. R.O. Blanchard and T.A. Tattar. Academic Press Inc. NY ISBN: 012103982X

Foliar Fungi of Western Trees, 1985. A. Funk. Canadian Forestry Service. Pacific Forest Research Centre, Victoria, BC

Forest Tree Diseases of the Prairie Provinces, 1987. Y. Hiratsuka. UNIpresses ISBN: 0662152816

Pacific Northwest Plant Disease Control Handbook. J. Pscheidt, editor. Agricultural Communications, Oregon State Univ., Corvallis, OR, 97331-2119 (available online at: pnwhandbooks.orst.edu/guide1998/index.htm)

Pests and Diseases of Herbaceous Perennials: The Biological Approach, 1999. S. Gill, D. L. Clement, & E. Dutky. Ball Publishing ISBN: 1-883052-20-3

Phytophthora, Its Biology, Taxonomy, Ecology, and Pathology. D.C. Erwin, S. Bartnicki-Garcia, & P. H. Tsao. American Phytopathological Society, [Order Online at APS Books](#), ISBN: 0890540845.

Scouting and Controlling Woody Ornamental Diseases in Landscapes and Nurseries, 1994. G. Moorman. Publications Distribution Center, Penn State University, 112 Agric. Administration Bldg. University Park, PA, 16802

Tree Rusts of Western Canada, 1974. W.G. Ziller. Canadian Forestry Service, #1329 Pacific Forest Research Center, Victoria, BC

Insects

A Color Atlas of Pests of Ornamental Trees, Shrubs and Flowers, 1995. D. V. Alford. Ball Publishing ISBN: 0-88192-561-6

Grower Talks on Pest Control, 2001. R. Blanchette, Editor. Ball Publishing ISBN: 1-883052-26-2

Insects That Feed On Trees and Shrubs, 2nd Revision, 1991. Johnson and Lyon, Comstock Publishing Assoc ISBN: 0801426022

Pacific Northwest Insect Control Handbook. Revised annually. Oregon State University Extension Service (available online at: pnwpest.org/pnw/insects)

Root Weevil Control on Rhododendrons (EB 0970), 1993. Antonelli and Campbell. Washington State University Cooperative Extension, Pullman, WA

Scale Insects on Ornamentals (EB 1552), 1990. Suomi. Washington State University Cooperative Extension, Pullman, WA

Spruce Spider Mite Biology and Control in Christmas Trees (Special Report 875), 1991. West *et al.* Oregon State University Extension Service, Corvallis, OR

Integrated Pest Management

Biological Control of Insect and Mite Pests of Woody Landscape Plants, 1993. Michael J. Raupp, Roy G. Van Driesche & John A. Davidson. American Nurseryman Publishing Co. Suite 2100, 77 W. Washington St., Chicago, IL, 60602-2904

IPM for Floriculture and Nurseries, 2001. University of California Statewide Integrated Pest Management Project, Ball Publishing ISBN: 1-879906-46-5

Integrated Pest Management Manual for Landscape Pests in British Columbia, 2000. Gilkeson.& Adams. BC Ministry of Environment, Lands and Parks ([available online](#))

IPM Training Manual For Wholesale Nursery Growers, 1992. S. Daar, H. Olkowski & W. Olkowski. B.I.R.C., P.O. Box 7414, Berkeley, CA, 94707

Landscape IPM, 1994. John A. Davidson & Michael Raupp. American Nurseryman Publishing Co. Suite 2100, 77 W. Washington St., Chicago, IL, 60602-2904

Natural Enemies Handbook: The Illustrated Guide to Biological Pest Control (#3386), 1998. University of California Statewide Integrated Pest Management Project; ISBN: 1-879906-41-4. Available from: University of California, Agriculture and Natural Resources, Phone: (510) 642-2431, 1-800-994-8849, Fax: (510) 643-5470, Email: danrcs@ucdavis.edu, Internet: <http://anrcatalog.ucdavis.edu>

Pacific Northwest Landscape Integrated Pest Management (IPM) Manual, 1999. Bobbitt *et al.* Washington State University Cooperative Extension. Available from the WSU Bulletin Office, 1-800-723-1763, or online <http://caheinfo.wsu.edu>

Pests of Landscape Trees and Shrubs - An Integrated Pest Management Guide, 1994. Dreistadt, Clark and Flint. University of California Publication 3359

Weeds

Common Weeds of Canada Field Guide, 1992. Gerald A. Mulligan. NC Press Ltd. (Agriculture Canada), Toronto, ON ASIN: 0920053599

Common Weeds of Canada, 1989. Gerald A. Mulligan. NC Press Ltd., Box 4010, Station A, Toronto, ON, M5H 1H8

Nursery And Landscape Weed Control Manual, 1992. Robert P. Price, Jr. Thomson Publications, P.O. Box 9335, Fresno, CA 93791 ISBN: 0685570061

Pacific Northwest Weed Control Handbook. Revised annually. Oregon State University Extension Service (available online at: pnwpest.org/pnw/weeds/)

Weed Biology and Control in Agriculture and Horticulture, 1985. Gwynne and Murray. Batsford Academic and Educational, London, UK ASIN: 0713435313 (Out of Print)

Weed Control - An Introductory Manual, 1994. BC Ministry of Agriculture, Fisheries & Food

Weeds of Canada, 1977. Agriculture & Agri-Food Canada, Publications Section, Room 118, Sir John Carling Building, 930 Carling Ave., Ottawa, ON, K1A 0C5

Weeds of the West, 9th Edition, 2000. Whitson. Western Society of Weed Science - University of Wyoming ISBN: 0941570134

PESTICIDES AND PESTICIDE SAFETY

Pesticide Applicators Course For Agricultural Producers, 1992. R. W. Adams, M. Betts, H. Sawatzky, and M. Waring. BC Ministry of Environment, Lands & Parks, Office Products Center, 4248 Glanford Ave., Victoria, BC, V8V 1X4

Standard Practices For Pesticide Applicators, A Manual of Health Information and Safe Practices for Workers Who Apply Pesticides, 1985. Workers' Compensation Board of BC, Box 5350, Vancouver, BC, V6B 5L5

PLANT IDENTIFICATION

An Encyclopedia of Shade Perennials, 2002. W. George Schmid. Ball Publishing ISBN: 0-88192-549-7

Herbaceous Perennial Plants, A Treatise on Their Identification, Culture, and Garden Attributes - 2nd Edition, 1997. Allan M. Armitage. Ball Publishing ISBN: 0-87563-810-4

BCLNA *Identification of BC's Optimum Ornamental Native Plants & Their Production Strategies* – 1995. Douglas Justice. BC Landscape & Nursery Association

Japanese Maples, 3rd Ed., 1987. J. D. Vertrees. Timber Press Inc. ISBN: 0-88192-501-2

Kalmia, The Laurel Book II, 1988. Richard A. Jaynes. Timber Press Inc. ISBN: 0-88192-367-2

Lilacs, The Genus Syringa, 1988. Fr. John L. Fiala. Timber Press Inc. ISBN: 0-88192-530-6

Manual of Cultivated Trees and Shrubs, 2nd Ed., 1990. Rehder. Dioscorides Press, 133 S.W. Second Ave, Suite 450, Portland, OR, 97204

Manual of Herbaceous Ornamental Plants, 1993. Steven M. Still. Stipes Publishing Co. ISBN: 0875634338

Manual of Woody Landscape Plants: Their Identification, Ornamental Characteristics, Culture, Propagation and Uses, 5th Edition, 1998. M. A. Dirr. Ball Publishing ISBN: 0875637957

Native Trees of Canada, 1969. R. C. Hosie. Environment Canada, Forestry Service

Perennial Gardening Guide, 4th Ed., 2003. John M. Valleau. Valleybrook International Ventures, Inc., Abbotsford, BC ISBN: 0969948328

Perennial Ground Covers, 1997. David S. MacKenzie. Prentice Hall Inc., Box 500, Englewood Cliffs, NJ, 07632 ISBN: 0-88192-557-8

Plants of Coastal British Columbia, 1994. Edited by J. Pojar & A. MacKinnon. Lone Pine Publishing, 202A - 1110 Seymour Street, Vancouver, BC, V6B 3N3

Success with Rhododendrons and Azaleas, 1992. H. Edward Reiley. Timber Press Inc. 133 S.W. Second Ave. Suite 450 Portland, OR, 97204

The Color Encyclopedia of Daylilies, 2000. Ted L. Petit and John P. Peat. Ball Publishing ISBN: 0-88192-488-1

The Color Encyclopedia of Ornamental Grasses, Sedges, Rushes, Restios, Cat-tails, and Selected Bamboos, 1999. Rick Darke. Ball Publishing ISBN: 0-88192-618-3

The Hosta Handbook, 2000. Mark R. Zilis. Ball Publishing ISBN: 0-9679440-0-7

The World Of Magnolias, 1994. Dorothy J. Callaway. Timber Press Inc. ISBN: 0-88192-236-6

Trees and Shrubs for Pacific Northwest Gardens, 2nd Ed., 1990. J. A. Grant & C. L. Grant (revised by M. E. Black, B. O. Mulligan, J. A. Witt & J. G. Witt). Timber Press ISBN: 0-88192-303-6

Trees and Shrubs for Temperate Climates, 3rd Rev. Ed., 1998. Courtright. Timber Press, Inc., Portland, OR ISBN: 0881924156

PROPAGATION

Breeding Ornamental Plants, D. J. Callaway & M. Brett Callaway, Editors. Ball Publishing ISBN: 0-88192-482-2

Grafting Methods For Propagating Ornamentals, VHS video, 115 minutes, 1991. Robert Fincham. American Nurseryman Publishing Co. Suite 2100, 77 W. Washington St. Chicago, IL, 60602-2904

Nursery Propagation of Woody and Herbaceous Perennials for the Prairie Provinces, 1982. Agriculture Canada Publication 1733E

Plant Propagation Volumes 1 & 2, VHS video 20 minutes per volume, 1986, Volume 1: Seed, specialized parts, division, micropropagation. Volume 2: cuttings, layering, grafting, budding. American Nurseryman Publishing Co. Suite 2100, 77 W. Washington St. Chicago, IL, 60602-2904

Plant Propagation A to Z, 2003. G. Bryant. Ball Publishing ISBN: 1-55297-688-2

Plant Propagation Practices, 1985. James S. Wells. American Nurseryman Publishing Co., Suite 2100, 77 W. Washington St. Chicago, IL, 60602-2904

Plant Propagation: Principles and Practices, 7th Edition, 2002. H. T. Hartmann, D. E. Kester, F. T. Davies Jr., & R. L. Geneve. Ball Publishing ISBN: 0-13-679235-9

Plants from Test Tubes: An Introduction to Micropropagation, 3rd Edition, 1996. Kyte and Kleyn. Timber Press ISBN: 0881923613

Practical Woody Plant Propagation for Nursery Growers, 1986. Bruce MacDonald. Timber Press, 133 S.W. Second Ave., Suite 450, Portland, OR, 97204 ISBN: 0881920622

Propagation and Production of Woody Ornamentals in a Small Nursery, 1982. Agdex 275/16, Alberta Agriculture, Print Media Branch 7000-113 Street, Edmonton, AB T6H 5T6

Seeds of Woody Plants in North America, 1992. James A. Young & Cheryl G. Young. Timber Press, 133 S.W. Second Ave, Suite 450, Portland, OR, 97204 ISBN: 0931146216

The Complete Book of Plant Propagation, 1997. Charles Heuser. Ball Publishing ISBN: 1-56158-234-4

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[Digger - a monthly publication of the Oregon Association of Nurseries.](#)

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Hortus Northwest - A Pacific Northwest Native Plant Directory & Journal, published two times per year. Hortus Northwest, PO Box 955, Canby, OR, 97013.

HortWest - a monthly publication of the British Columbia Landscape & Nursery Association

[International Plant Propagators' Society Combined Proceedings](#) - an annual publication from the International Plant Propagators' Society.

[Landscape Trades](#) - published 9 times per year by Landscape Ontario.

Lookout - published 3 times per year by the Pacific Northwest Christmas Tree Association

[Nursery Management & Production \(NM PRO\)](#) - published 12 times per year. NMPRO P.O. Box 1868 Fort Worth, TX, 76101-1868. Tel: (817) 882-4120, Toll Free: (800) 433-5612, Fax: (817) 882-4121.

Perennial Plants - published 4 times per year by the Perennial Plant Association

Plant Propagator - North American Regions, published 3 times per year by the International Plant Propagators' Society, 315 Tyson, University Park, PA, 16802

[Prairie Landscape Magazine - a bimonthly publication of the Landscape Alberta Nursery Trades Association.](#)

[The IPM Practitioner](#) - a monthly publication focusing on IPM in agriculture, horticulture, landscape, structural, urban, veterinary. Bio-Integral Resource Centre, P.O. Box 7414, Berkeley, CA, 94707.