

*This chapter is part of
“A Manual of Integrated Pest Management for Urban Landscapes for British Columbia”
prepared in 1993 by Mario Lanthier and Linda Edwards
Integrated Crop Management Inc., Okanagan Centre, British Columbia
and submitted to the B.C. Ministry of Environment, Lands and Parks, Victoria B.C.*

**CHAPTER 9
APPENDICES:
PLANTS FOR SPECIAL SITES, IPM PROGRAMS, READING MATERIALS**

TABLE OF CONTENTS

A) TREES	2
Table 9-1: Whips ordered by the City of Victoria for the spring of 1994	2
Table 9-2: Trees for street and park planting.....	3
Table 9-3: Small trees for the home landscape	4
Table 9-4: Flood-tolerant woody plants in the contiguous United States.....	5
Table 9-5: Relative susceptibility of trees to sulphur dioxide	6
C) SHRUBS AND FLOWERS	7
Table 9-6: Rose varieties selected for the Burnaby Centennial Rose Garden, 1991	7
Table 9-7: Rose varieties resistant to certain diseases	8
Table 9-8: Native plants of the Okanagan suitable for use in a landscape setting	10
Table 9-9: Plants for cold areas.....	12
Table 9-10: Hybrid rhododendrons showing resistance to feeding by root weevils.....	13
D) TURFGRASS CULTIVARS	14
Table 9-11: Suitable lawn seed mixtures for Coastal British Columbia	14
Table 9-12: Suitable lawn seed mixtures for Interior British Columbia	14
Table 9-13: Preferred turfgrass cultivars from testing at Agriculture Canada.....	15
Table 9-14: Preferred turfgrass cultivars from testing at Washington State University	16
E) I.P.M. POLICIES IN BRITISH COLUMBIA MUNICIPALITIES	17
i) Board of Parks and Recreation, City of Vancouver.....	17
ii) Parks and Recreation Department, City of Victoria: IPM Procedure.....	17
iii) Parks Operations, City of Coquitlam: Integrated Vegetation Management Plan	19
F) RECOMMENDED READING MATERIAL	21
i) Integrated Pest Management theory and practice	21
ii) Insect, Disease and Weed Identification	22
iii) Plant selection and Identification	24
iv) Plant Care.....	24
v) Pest Control.....	25

**CHAPTER 9
APPENDICES:
PLANTS FOR SPECIAL SITES, IPM PROGRAMS, READING MATERIALS**

A) TREES

Table 9-1: Whips ordered by the City of Victoria for the spring of 1994

Whips	Genera, species and cultivar	Common name
5	<i>Acer platanoides</i> 'Columnare'	Norway maple, columnar
10	<i>Acer platanoides</i> 'Deborah'	Norway maple, Deborah
10	<i>Acer platanoides</i> 'Globosa'	Norway maple, Globosa
5	<i>Acer platanoides</i> 'Summershade'	Norway maple, Summers.
2	<i>Catalpa bignonioides</i> 'Nana'	Indian bean
20	<i>Cladrastis lutea</i>	American yellowwood
10	<i>Davidia involucrata</i>	Date-tree
10	<i>Elaeagnus angustifolia</i>	Russian olive-tree
20	<i>Fraxinus ornus</i>	Flowering ash
20	<i>Gymnocladus dioicus</i>	Kentucky coffe tree
10	<i>Halesia montisca</i>	Silverbell
10	<i>Halesia tetraptera</i>	Silverbell
10	<i>Koelreuteria bipinnata</i>	Golden rain tree
10	<i>Koelreuteria paniculata</i>	Golden rain tree
10	<i>Koelreuteria paniculata</i> 'Fastigiata'	Golden rain tree, Fastigiata
5	<i>Magnolia grandiflora</i>	Southern magnolia
20	<i>Oxydendrum arboreum</i>	Sorrel tree
10	<i>Paulownia tomentosa</i>	Empress tree
5	<i>Platanus X Acerfolia</i> 'Bloodgood'	London plane tree
15	<i>Robinia pseudoacacia</i> 'Fastigiata'	Black locust
5	<i>Sophora japonica</i> 'Village Green'	Japanese pagodatree
10	<i>Sorbus hupehensis</i> 'Pink Pagoda'	Mountain ash (relative)
10	<i>Styrax japonica</i>	Japanese snowball
10	<i>Styrax obassia</i>	Fragrant snowball
10	<i>Tilia tomentosa</i>	Silver linden
2	<i>Ulmus glabra</i> 'Camperdownii'	Scotch elm
20	<i>Zelkova serrata</i>	Japanese zelkova
284	Total	

Source: Yvan Caron, "Thetis Nursery Status Report July 1993", Parks and Recreation Department (Victoria, B.C.), 1993.

NOTE: the process leading to the selection of trees on this list is discussed in Chapter 3 A): "Selection Of Trees". The reader is advised to consult the text for a full understanding of the plant selection process.

Table 9-2: Trees for street and park planting

List of landscape trees for large sites and long duration of use

Botanical name	Common name	Characteristics
		Pest problems
<i>Ailanthus altissima</i>	Tree of heaven	Fast growing to 60 feet Tolerant of soil moisture and pH No serious disease or insect pests
<i>Platanus X acerifolia</i>	London plane tree	To 100 feet Survives bad city conditions Anthracnose in wet climate
<i>Populus trichocarpa</i>	Cottonwood poplar	To 150 - 200 feet Tolerant of poor and dry soils Brittle wood poses safety hazards
<i>Acer platanoides</i>	Norway maple	To 90 feet Also: <i>A. rubrum</i> (red maple) and <i>A. macrophyllum</i> (big-leaf maple)
<i>Tilia cordata</i>	Little-leaf linden	To 90 feet Tough, durable tree Subject to leaf-feeding insects
<i>Aesculus hippocastanum</i>	Horse-chesnut	Fast growing to 100 feet or more Durable in poor city soils Subject to leaf diseases
<i>Ginkgo biloba</i>	Maidenhair tree	To 75 feet or more Notable pollution tolerance Needs no spraying, little pruning
<i>Robinia pseudoacacia</i>	Black locust	Quick growth to 60 or 70 feet Tolerant of poor soils and road salts Susceptible to insects, diseases
<i>Quercus palustris</i>	Pin oak	To 60 or 80 feet Also: <i>Q. rubra</i> (red oak) and <i>Q. phellos</i> (willow oak)
<i>Carpinus betulus</i>	European hornbeam	To 30 feet Tolerates clay but not wet soil Few pests
<i>Ulmus parvifolia</i>	Chinese elm	To 45 or 50 feet Tolerance of dry, poor soils Partly resistant to Dutch disease
<i>Magnolia kobus</i>		To 50 feet Tolerance of street conditions Subject to vandalism when in bloom

Source: Black, M., "Trees for Street and Park Planting", in: "Trees and Shrubs for Coastal British Columbia Gardens", Whitecap Books (Vancouver, B.C.), Second Edition, 1990.

Table 9-3: Small trees for the home landscape

List of landscape or street trees up to 35 feet tall by 35 feet wide.
Can be single stem, multi-trunked and low branched.

Botanical name	Common name	Characteristics and Pest problems
<i>Acer campestre</i>	Hedge Maple	Moderately drought tolerant
<i>Acer ginnala</i>	Amur Maple	Hardy and pH and drought tolerant
<i>Acer tataricum</i>	Tartarian Maple	Drought and pH tolerant
<i>Amelanchier</i> spp.	Serviceberry	Newer cultivars are pest-free
<i>Aralia elata</i>	Japanese Angelica-tree	Pest free with an unusual form
<i>Carpinus betulus</i>	European Hornbeam	Very tolerant, problem-free plant
<i>Carpinus carolinianum</i>	American hornbeam	Excellent small tree worthy of trial
<i>Clerodendron trichotomum</i>	Harlequin Glorybower	Unusual for late bloom and fruit
<i>Cornus maslofficialis</i>	Corneliancherry Dogwood	Pest free, early season interest
<i>Cornus kousa</i>	Kousa Dogwood	Anthraco-nose resistant
<i>Crataegus X lavellei</i>	Lavalle Hawthorn	Good foliage, flower
<i>Hydrangea paniculata</i>	Panicle Hydrangea	Effective as a small tree
<i>Oxydendrum arboreum</i>	Sorrel Tree, Sourwood	Late season interest, fall color
<i>Parrotia persica</i>	Persian Parrotia	Good foliage, pest resistant
<i>Pterostyrax hispida</i>	Fragrant Epaulettetree	Late flowering, pest free
<i>Pyrus calleryana</i> cvs.	Callery Pear cvs	Some cvs are fireblight resistant
<i>Rhus copallina</i>	Flameleaf Sumac	Problem free, drought tolerant
<i>Rhus typhina</i>	Stagehorn sumac	Problem free, fall color
<i>Stewartia monodelpha</i>	Tall Stewartia	Mottled cinnamon bark, fall color
<i>Stewartia pseudocamillia</i>	Japanese Stewartia	Mottled bark, late flowering
<i>Styrax japonicus</i>	Japanese Snowbell	Trouble-free, late flowering
<i>Syringa reticulata</i>	Japanese Tree Lilac	Relatively pest free and hardy

Source: Maleike, R., "Small Trees For The Home Landscape", Washington State University (Puyallup WA), 1992.

- Criteria for selection:
- adaptability to the site
 - disease resistance
 - insect resistance
 - seasonal interest.

Table 9-4: Flood-tolerant woody plants in the contiguous United States

The species listed withstood 180 or more days of water covering the soil under trees. Observations were made in the 10 U.S. Corps of Engineers Divisions in the contiguous U. S.A.

Botanical name	Common name	Hardiness range
<i>Acer negundo</i>	Box elder	Zones 2 - 9
<i>Acer rubrum</i>	Red maple	Zones 3 - 9
<i>Acer saccharinum</i>	Silver maple	Zones 3 - 9
<i>Carya aquatica</i>	Water hickory	Zones 4 - 8
<i>Carya illinoensis</i>	Pecan	Zones 5 - 9
<i>Carya ovata</i>	Shagbark hickory	Zones 4 - 8
<i>Cephalanthus occidentalis</i>	Buttonbush	Zones 5 - 10
<i>Cornus stolonifera</i>	Red-osier dogwood	Zones 2 - 8
<i>Crataegus mollis</i>	Red hawthorn	Zones 3 - 6
<i>Diospyros virginiana</i>	Persimmon	Zones 4 - 9
<i>Fraxinus pennsylvanica</i>	Green ash	Zones 3 - 9
<i>Gleditsia triacanthos</i>	Honey locust	Zones 3 - 9
<i>Ilex decidua</i>	Deciduous holly	Zones 5 - 9
<i>Liquidambar styraciflua</i>	Liquidambar	Zones 5 - 9
<i>Nyssa aquatica</i>	Water tupelo	Zones 6 - 9
<i>Platanus X acerifolia</i>	London plane	Zones 4 - 8
<i>Platanus occidentalis</i>	Sycamore	Zones 4 - 9
<i>Populus deltoides</i>	Eastern cottonwood	Zones 2 - 9
<i>Quercus bicolor</i>	Swamp white oak	Zones 3 - 8
<i>Quercus lyrata</i>	Overcup oak	Zones 5 - 9
<i>Quercus macrocarpa</i>	Bur oak	Zones 2 - 8
<i>Quercus palustris</i>	Pin oak	Zones 4 - 8
<i>Salix</i> spp.	Willow	Zones 2 - 9
<i>Salix alba</i> var. <i>tristis</i>	Golden weeping willow	Zones 2 - 9
<i>Taxodium distichum</i>	Bald cypress	Zones 4 - 9
<i>Ulmus americana</i>	American elm	Zones 2 - 9

Adapted from: Whitlow, T.H. and R.W. Harris, "Flood Tolerance in Plants: A State-of-the-Art Review", 1979, cited in Harris, R.W., "Arboriculture: Integrated Management of Landscape, Trees, Shrubs, and Vines", Prentice Hall Inc. (Englewood Cliffs, NJ), 2nd Edition, 1992.

The information for the hardiness range is taken from Dirr, M.A., "Manual of Woody Landscape Plants", Stipes Publishing Company (Illinois), Fourth Edition, 1990.

Table 9-5: Relative susceptibility of trees to sulphur dioxide

Sensitive	Intermediate	Tolerant
<i>Acer negundo</i>	<i>Abies balsamea</i>	<i>Abies amabilis</i>
<i>Amelanchier alnifolia</i>	<i>Abies grandis</i>	<i>Abies concolor</i>
	<i>Acer glabrum</i>	<i>Acer platanoides</i>
	<i>Acer negundo</i>	<i>Acer saccharinum</i>
<i>Betula papyrifera</i>	<i>Acer rubrum</i>	<i>Acer saccharum</i>
<i>Betula pendula</i>	<i>Alnus tenuifolia</i>	
<i>Betula populifolia</i>	<i>Betula occidentalis</i>	<i>Crataegus douglasii</i>
<i>Fraxinus pennsylvanica</i>		<i>Ginkgo biloba</i>
<i>Larix occidentalis</i>		<i>Juniperus occidentalis</i>
		<i>Juniperus osteosperma</i>
	<i>Picea engelmannii</i>	<i>Juniperus scopulorum</i>
	<i>Picea glauca</i>	<i>Picea pungens</i>
<i>Pinus banksiana</i>	<i>Pinus contorta</i>	<i>Pinus edulis</i>
<i>Pinus resinosa</i>	<i>Pinus nigra</i>	<i>Pinus flexilis</i>
<i>Pinus strobus</i>	<i>Pinus ponderosa</i>	<i>Platanus X acerifolia</i>
<i>Populus grandidentata</i>	<i>Populus augustifolia</i>	<i>Populus X canadensis</i>
<i>Populus nigra 'Italica'</i>	<i>Populus balsamifera</i>	
<i>Populus tremuloides</i>	<i>Populus deltoides</i>	
	<i>Populus trichocarpa</i>	
	<i>Prunus armeniaca</i>	<i>Quercus gambelii</i>
	<i>Prunus virginiana</i>	<i>Quercus palustris</i>
	<i>Pseudotsuga menziesii</i>	<i>Quercus rubra</i>
	<i>Quercus alba</i>	<i>Rhus glabra</i>
<i>Rhus typhina</i>		
<i>Salix nigra</i>		
<i>Sorbus sitchensis</i>	<i>Sorbus aucuparia</i>	<i>Thuja occidentalis</i>
	<i>Syringa vulgaris</i>	<i>Thuja plicata</i>
	<i>Tilia americana</i>	<i>Tilia cordata</i>
	<i>Tsuga heterophylla</i>	
<i>Ulmus parvifolia</i>	<i>Ulmus americana</i>	

Adapted from Davis, D.D. and H.D. Gerhold, "Selection of trees for tolerance of air pollutants", cited in: Kozlowski, T.T., "Responses of Shade Trees to Pollution", *Journal of Arboriculture*, 6(2): 32, 1980.

Note:

The effect of sulphur dioxide and other city pollutants is discussed in Chapter 3: "Trees Of Parks And Boulevards: The Application Of Integrated Pest Management".

C) SHRUBS AND FLOWERS

Table 9-6: Rose varieties selected for the Burnaby Centennial Rose Garden, 1991

This list of plants was recommended by Burnaby rosarians.

Hybrid Tea	
Chicago Peace	Electron
Elina	Flamingo
Fragrant Cloud	Honor
Ingrid Bergman	John Waterer
Keepsake	Lady Rose
Loving Memory	Marijke Koopman
Nantucket	National Trust
Pascali	Peace
Precious Platinum	Silver Jubilee
Floribunda	
Amber Queen	Evelyn Fison
Iceberg	Liverpool Echo
Margaret Merrill	Molly McCredy
Radox Bouquet	Sun Flare
Sexy Roxy	
Grandiflora	
Queen Elizabeth	Tournament of Roses

Adapted from: City of Burnaby, "Centennial Rose Garden Acquisition of Plants", 1991.

The proposal for a Centennial Rose Garden was made by Burnaby members of the Vancouver Rose Society. A list of recommended rose varieties was prepared by Mark Stockdale, Doug Hosgood and Art Pastro, based on field experience from the 1100 Society members. The varieties selected perform well in Vancouver conditions, have good hardiness and are less prone than other varieties to blackspot / powdery mildew.

The cultivars may react differently in other areas of British Columbia. Disease control for roses is discussed in chapter 4: "IPM for shrubs, flower beds and display gardens".

Research information on rose cultivar disease resistance, not presented here, is available from Agriculture Canada based on tests at Morden, Manitoba. The list is provided in "Nursery Crop Production Guide for Commercial Growers", B.C. Ministry of Agriculture, Fisheries and Food (Victoria, B.C.), 1993-94 edition, page 89.

Other information is available on rose cultivar disease resistance, based on tests at the Portland, Oregon International Rose Test Garden, and the Longview, Washington Public Library Rose Garden. The list is provided in "Plant Disease Control Handbook", Agricultural Communications of Oregon State University (Corvallis, OR), 1992 edition, pages 158 and 159.

Table 9-7: Rose varieties resistant to certain diseases

Based on information from the Agriculture Canada Research Station in Morden, Manitoba

<i>Rosa</i> spp.	Disease		
	Black Spot	Powdery Mildew	Rust
Hybrid Tea			
Aztec	H. Res.	H. Res.	M. Res.
Bewitched	H. Res.	H. Res.	H. Susc.
Charlotte Armstrong	H. Res.	M. Res.	M. Res.
Chicago Peace	H. Res.	M. Res.	M. Res.
Chrysler Imperial	H. Res.	H. Susc.	H. Susc.
Command Performance	H. Res.	Susc.	H. Res.
Eclipse	---	H. Susc.	M. Res.
Ena Harkness	H. Res.	H. Susc.	H. Susc.
Fragrant Cloud	H. Res.	M. Res.	H. Res.
Garden Party	H. Res.	H. Susc.	H. Res.
Helen Traubel	H. Res.	M. Res.	M. Res.
Irish Gold	H. Res.	H. Res.	H. Res.
Kordes Perfecta	H. Res.	H. Res.	H. Susc.
Miss All American Beauty	H. Res.	H. Res.	H. Susc.
Mister Lincoln	H. Res.	H. Susc.	H. Susc.
Mojave	M. Res.	M. Res.	M. Res.
Pascali	H. Res.	M. Res.	M. Res.
Peace	H. Res.	M. Res.	H. Susc.
Pink Peace	H. Res.	M. Susc.	H. Susc.
Red Devil	M. Res.	H. Res.	H. Res.
Royal Highness	M. Res.	H. Susc.	H. Susc.
Tiffany	H. Res.	M. Res.	M. Res.
Tropicana	H. Res.	H. Susc.	H. Res.
Floribunda			
Elizabeth of Glamis	H. Res.	M. Res.	M. Res.
Europeana	H. Res.	H. Res.	H. Res.
Gene Boerner	H. Res.	M. Susc.	H. Res.
Pinnocchio	H. Res.	M. Susc.	H. Res.
Redgold	H. Res.	M. Susc.	H. Res.
Roman Holiday	M. Susc.	M. Susc.	H. Res.
Sarabande	H. Res.	H. Res.	H. Res.
Spartan	H. Res.	M. Susc.	H. Res.
Grandiflora			
Aquarius	H. Res.	M. Res.	M. Res.
Camelot	H. Res.	M. Res.	H. Susc.
Comanche	H. Res.	H. Res.	H. Susc.
Montezuma	H. Res.	H. Susc.	H. Susc.
Ole	M. Res.	H. Res.	M. Res.
Pink Parfait	M. Res.	M. Res.	M. Res.
Queen Elizabeth	H. Res.	Susc.	M. Res.
Scarlet Knight	M. Res.	M. Res.	M. Res.
Shrub Roses			

Adelaide Hoodless	H. Susc.	H. Res.	M. Res.
Alexander McKenzie	H. Res.	H. Res.	M. Res.
Assiniboine	M. Susc.	Sl. Susc.	H. Susc.
ChAMPLAIN	M. Susc.	H. Res.	---
Cuthbert Grant	H. Res.	H. Res.	Sl. Susc.
Henry Kelsey	M. Res.	H. Res.	H. Res.
John Cabot	Sl. Susc.	H. Res.	H. Res.
John Davis	H. Res.	H. Res.	M. Res.
John Franklin	M. Res.	H. Res.	M. Susc.
Morden Blush	M. Res.	H. Res.	H. Res.
Morden Cardinette	M. Susc.	Sl. Susc.	H. Res.
Morden Centennial	M. Res.	H. Res.	M. Res.
Morden Fireglow	M. Res.	H. Res.	Sl. Susc.
Morden Ruby	M. Res.	H. Res.	H. Res.
Nearlywild	H. Res.	H. Res.	H. Res.
Prairie Joy	H. Res.	H. Res.	H. Res.
Prairie Princess	M. Res.	--	H. Res.
Prairie Youth	M. Susc.	H. Res.	Sl. Susc.
<i>foetida bicolor</i> 'Persian Yellow'	H. Susc.	Sl. Susc.	--
<i>rubifolia</i>	M. Res.	H. Res.	H. Res.
<i>rugosa</i> hybrid 'Blanc double de Coubert'	H. Res.	H. Res.	H. Res.
<i>rugosa</i> hybrid 'Charles Albanel'	M. Res.	H. Res.	H. Res.
<i>rugosa</i> hybrid 'Hansa'	H. Res.	--	--
<i>rugosa</i> hybrid 'Henry Hudson'	H. Res.	H. Res.	H. Res.
<i>rugosa</i> hybrid 'Jens Munk'	Sl. Susc.	H. Res.	H. Res.

Source: Ministry of Agriculture, Fisheries and Food, "Nursery Crop Production Guide for Commercial Growers 1993-94 Edition", Carol Barnett editor, Victoria, B.C., 1993.

Key:

H. Res. = Highly Resistant M. Res. = Moderately Resistant
H. Susc. = Highly Susceptible M. Susc. = Moderately Susceptible Sl. Susc. = Slightly Susceptible

The incidence of rust decreases if the stems with the overwintering stage are pruned out and destroyed early in the year.

Other information is available on rose cultivar disease resistance, based on tests at the Portland, Oregon International Rose Test Garden, and the Longview, Washington Public Library Rose Garden. The list is provided in "Plant Disease Control Handbook", Agricultural Communications of Oregon State University (Corvallis, OR), 1992 edition, pages 158 and 159.

Table 9-8: Native plants of the Okanagan suitable for use in a landscape setting

The following plants naturally grow in the dry summer and cold winter conditions of the Interior.

They are also selected for their attractive appearance by the author, a landscape designer.

Plant	Common name
Trees	
<i>Acer glabrum douglasii</i>	Douglas rocky mountain maple
<i>Betula papyrifera</i>	Paper birch
<i>Juniperus scopulorum</i>	Rocky mountain juniper
<i>Pinus contorta latifolia</i>	Lodgepole pine
<i>Pinus ponderosa</i>	Ponderosa pine
<i>Populus tremuloides</i>	Quaking aspen
<i>Prunus virginiana melanocarpa</i>	Black chokeberry
<i>Pseudotsuga menziesii glauca</i>	Interior douglas fir
<i>Sorbus scopulina</i>	Mountain ash
Shrubs	
<i>Amelanchier alnifolia</i>	Saskatoon
<i>Artemesia frigida</i>	Fringed wormwood
<i>Artemesia tridentata</i>	Big sagebrush
<i>Ceanothus velutinus</i>	Buck brush or wild lilac
<i>Chrysothamnus nauseosus</i>	Rabbit brush
<i>Cornus stolonifera</i>	Red-osier dogwood
<i>Holodiscus discolor</i>	Ocean spray or arrow wood
<i>Juniperus communis</i>	Common juniper
<i>Lonicera utahensis</i>	Utah honeysuckle
<i>Mahonia aquifolium</i>	Oregon grape
<i>Pachistima myrsinites</i>	Oregon boxwood
<i>Philadelphus lewisii</i>	Wild mock orange
<i>Purshia tridentata</i>	Bitter brush
<i>Rhus glabra</i>	Smooth sumac
<i>Ribes cereum</i>	Squaw currant
<i>Rosa</i> spp.	Rose, 4 native species
<i>Sambucus caerulea</i>	Blue elder berry
<i>Shepherdia canadensis</i>	Buffalo berry
<i>Spiraea betulifolia</i>	Birchleaf spiraea
<i>Saymphoricarpos lbus</i>	Common snow berry

Perennial Flowers

<i>Achillea millefolium</i>	Yarrow
<i>Arctostaphylos uva-ursi</i>	Kinnikinnick
<i>Balsamorhiza sagittata</i>	Balsamroot
<i>Calochortus macrocarpa</i>	Mariposa or Star tulip
<i>Cornus canadensis</i>	Bunchberry
<i>Erigeron</i> spp.	Fleabane
<i>Eriogonum</i> spp.	Wild buckwheat
<i>Gaillardia aristata</i>	Blanket flower
<i>Lewisia rediviva</i>	Bitterroot
<i>Linnaea borealis</i>	Twin flower
<i>Opuntia fragilis</i>	Prickly-pear cactus
<i>Penstemon scouleri</i>	Beard tongue
<i>Phacelia heterophylla</i>	Blue bells
<i>Sedum</i> spp.	Stonecrop
<i>Tiarella trifoliata</i>	False mitrewort

Ornamental Grasses

<i>Arrhenatherum elatius</i> 'Variegatum'	Oat grass
<i>Festuca ovina</i> 'Glauca'	Blue fescue
<i>Phalaris arundinacea</i> 'Picta'	Ribbon grass

Adapted from: Duckworth, Alan, "Gardening with Native Plants of the Okanagan", course material (Kelowna, B.C.), 1993.

The use of native plants and the selection of plants with low water requirements is covered in Chapter 4: "Shrubs, Flower Beds And Display Gardens: The Application Of Integrated Pest Management".

Table 9-9: Plants for cold areas

The following plants can withstand winter cold of -40°C and are appropriate in northern B.C.

The selection was made at Gallatin Nursery, from Barrhead Alberta.

Plant	Common name
Trees	
<i>Acer negundo</i>	Manitoba maple
<i>Betula pendula</i>	White birch
<i>Fraxinus pennsylvanica lanceolata</i>	Green ash
<i>Malus hybrids</i>	Flowering crabapple
<i>Picea glauca</i>	White spruce
<i>Picea engelmannii</i>	Engelman spruce
<i>Picea pungens</i>	Colorado spruce
<i>Pinus sylvestris</i>	Scots pine
<i>Prunus maackii</i>	Amur chokecherry
<i>Prunus padus commutata</i>	Bird cherry or Mayday
<i>Prunus virginiana 'Schubert'</i>	'Schubert' chokecherry
<i>Salix pentandra</i>	Laurel willow
<i>Sorbus aucuparia</i>	European mountain ash
<i>Sorbus americana</i>	American mountain ash
<i>Tilia cordata</i>	Little-leaf linden
<i>Ulmus americana</i>	American elm
Shrubs	
<i>Amelanchier alnifolia</i>	Saskatoon
<i>Hydrangea paniculata</i> cultivars	Peegee hydrangea
<i>Juniperus chinensis</i> cultivars	Shrub junipers
<i>Philadelphus coronarius</i> cultivars	Mock orange
<i>Physocarpus opulifolia 'Luteus'</i>	Golden ninebark
<i>Potentilla fruticosa</i> cultivars	Bush cinquefoil
<i>Rosa rugosa</i> cultivars	Rugosa rose
<i>Spiraea x bumalda</i> cultivars	Bumalda spirea
<i>Spiraea x vanhouttei</i>	Vanhoutte spirea
<i>Syringa reticulata</i> cultivars	Japanese tree lilac

Adapted from Gallatin, A., "Thriving In Albrrrta", *American Nurseryman*, July 1, 1988

The list was reviewed in December 1993 by Margaret Van Skiver, of R & M Nursery Ltd. (Fort St. John, B.C.). The plants listed are commercially available in northern British Columbia and perform well against sudden winter temperature changes.

Table 9-10: Hybrid rhododendrons showing resistance to feeding by root weevils

Rhododendron hybrid	Adult root weevil injury rating
P.J. Mezzitt (P.J.M.)	100
Jock	92
Sapphire	90
Rose Elf	89
Cilpimense	88
Lucky Strike	83
Exbury Naomi	81
Virginia Richards	81
Cowslip	80
Luscombei	80
Vanessa	80
Oceanlake	80
Dora Amateis	79
Crest	79
Rainbow	76
Point Defiance	76
Naomi	76
Pilgrim	76
Letty Edwards	76
Odee Wright	76
Moonstone	73
Lady Clementine Mitford	72
Candi	72
Graf Zeppelin	71
Snow Lady	71
Loderi Pink Diamond	71
Faggetter's Favourite	70

Source: Antonelli, A.L. et al., "How To Identify Rhododendron and Azalea Problems", Washington State University Cooperative Extension (Pullman, WA), Revised Edition, 1991.

*: The higher the number, the less feeding is expected. A 100 rating indicates complete resistance.

D) TURFGRASS CULTIVARS

Table 9-11: Suitable lawn seed mixtures for Coastal British Columbia

Mixture no.	Percentage by weight				Seeding rate kg / 100 m ²
	Kentucky bluegrass	Fine fescue	Colonial bentgrass	Perennial ryegrass	
1	-	80	20	-	1.5
2	30	60	10	-	1.8
3	40	60	-	-	2.0
4	30	40	-	30	2.5

Mixture no. 1 gives a high-maintenance lawn of fine-texture grasses.

Mixture no. 2 is predominantly fine-textured but does well with average maintenance.

Mixture no. 3 is a basic lawn mixture that tolerates moderate shade.

Mixture no. 4 contains perennial ryegrass for greater tolerance for wear in areas of hard use.

Colonial bentgrass tend to dominate other grasses in mixtures in coastal B.C., but makes an attractive lawn with good management. Do not use creeping bentgrass in lawns.

Table 9-12: Suitable lawn seed mixtures for Interior British Columbia

Mixture no.	Percentage by weight				Seeding rate kg / 100 m ²
	Kentucky bluegrass	Fine fescue	Perennial ryegrass	Crested wheatgrass	
1	40	60	-	-	2.0
2	30	40	30	-	2.5
3	20	-	-	80	2.5
4	-	-	-	100	3.0

Mixture no. 1 is a basic lawn mixture that tolerates moderate shade.

Mixture no. 2 contains perennial ryegrass for greater tolerance for wear in areas of hard use.

Mixture no. 3 provides a better-quality lawn for dry areas if adequate water is available.

Mixture no. 4 for dry areas where supplementary water is not available.

Perennial ryegrass is not sufficiently winter hardy for colder parts of the interior but provides good wearability where it can be grown.

Source: Fushtey, S.G., L.G. Denby, A.McLean, "Lawns for Southern British Columbia", Agriculture Canada Research Branch (Agassiz, B.C.), 1982.

Table 9-13: Preferred turfgrass cultivars from testing at Agriculture Canada

Turfgrass cultivars licensed for sale in Canada,
listed in order of performance (1 being best) in tests
at Agriculture Canada Research Stations of Agassiz and Kamloops.

AGASSIZ TEST	KAMLOOPS TEST
BLUEGRASS	
1. Bristol	1. Baron, Touchdown
2. Sydsport, Cheri, Baron, Birka, Victa	2. Majestic, Birka, Bono
3. Geronimo, Enmundi, Merion, Nugget, Adelphi, Bono, Majestic	3. Sydsport, Fylking, Merion, Dormie
4. Touchdown, Glade, Fylking, Ram I	4. Geronimo, Adelphi, Cheri, Park
5. Plush, Park, Dormie, Banff	
FESCUES	
1. Dawson, Koket, Highlight, Menuet	1. Boreal, Highlight, Pennlawn
2. Banner, Agram, Biljart, Jamestown	2. Menuet, Durlawn, Dawson, Jamestown, Reptans
3. Barfalla, Pennlawn, Boreal, Reptans	3. Koket, Barfalla
COLONIAL BENTGRASS	
1. Bardot, Tracenta	Not recommended for interior
2. New Zealand Browntop	
3. Astoria, Highland	
PERENNIAL RYEGRASS	
1. Fiesta, Loretta	1. Diplomat, Omega, Loretta, Pennfine
2. Blazer, Manhattan, Pennfine,	2. Manhattan, Yorktown II
3. Derby, Omega	3. Derby, Norlea
4. Norlea	

Use only top-quality seed, guaranteed to contain the seeds you desire. Cheap seed may have lower germination and may contain more weed seeds and undesirable grasses or foreign material.

Source: Fushtey, S.G., L.G. Denby, A.McLean, "Lawns for Southern British Columbia", Agriculture Canada Research Branch (Agassiz, B.C.), 1982.

Table 9-14: Preferred turfgrass cultivars from testing at Washington State University

Evaluated in Western Washington, Oregon and British Columbia
During the past 10 years

PERENNIAL RYEGRASS			
DIMENSION	MANHATTAN II	CHARGER	COMPETITOR
OMEGA II	CITATION II	PALMER	COMMANDER
BLAZER II	BLAZER	TARA	GATOR
BIRDIE II	SATURN	SR 4100	FIESTA II
DANDY			
FINE FESCUES			
		CREEPING	
ESTICA	FLYER	ENSYLVA	
		CHEWINGS	
MARY	WEEDEND	TAMARA	EPSOM
ENJOY	VICTORY	LONGFELLOW	
		HARD / SHEEP	
SR 3000	AURORA	RELIANT	SPARTAN

Adapted from: Washington State University, "1991 Turfgrass Field Day", Puyallup Research and Extension Center (Puyallup, WA), June 25 and 26, 1991.

NOTE:

The cultivars listed have the best test records during the period 1981 - 1991 in western Washington, Oregon and British Columbia. They are recommended for use where high quality turf is expected.

Kentucky bluegrass did not appear well adapted to western Washington, so only the best cultivars should be used. Other cultivars of Kentucky bluegrass soon disappeared from the turf. The turftype tall fescues are less well understood and have been very inconsistent between locations.

E) I.P.M. POLICIES IN BRITISH COLUMBIA MUNICIPALITIES

i) Board of Parks and Recreation, City of Vancouver

It is the policy of the Board of Parks and Recreation that park maintenance and pest problem control be conducted through an Integrated Pest Management approach. An Integrated pest Management approach is the best combination of cultural, biological, genetic and chemical methods for the most effective control of pests. It is the goal of the Board to ultimately eliminate chemical use.

Pest control materials and activities should be the:

- least hazardous to human health;
- least disruptive of natural controls;
- least toxic to non-targets;
- least damaging to the general environment;
- most likely to effect permanent pest reduction;
- easiest to carry out effectively; and
- most cost effective.

Physical / cultural and biological / genetic control methods shall receive priority consideration for solving any pest problem. Chemical control strategies shall be used only where a mix of other strategies is inadequate and the pest damage would cause loss. Where chemical treatment is required, the above tactics should be used.

Free public access facilities shall have no or minimal pesticide use, except where irreversible damage would result. This includes general lawn areas in playgrounds, picnic areas and non-playing field portions of parks, boulevard medians, street trees and wild areas.

Maintenance of areas having controlled or no public access or those of a display nature shall have use of registered pesticides in accordance with this policy. Similarly, given the necessity of maintaining playing field surfaces, these facilities' maintenance will also have use of registered pesticides in accordance with this policy.

Where chemical controls are required, those used shall be chosen on the basis of highest effectiveness and selectivity and least hazard to health and environment. Any chemical under review by Agriculture Canada for a health or environmental reason shall not be used.

Posting sites of chemical pesticide use shall be in accordance with City Bylaws as they develop.

Parks facilities shall be constantly monitored for pest problems so that they are treated as quickly as possible, minimizing the damage and amount of treatment required.

ii) Parks and Recreation Department, City of Victoria: IPM Procedure

It is the City of Victoria, Parks Department's policy that park maintenance and pest control be conducted through an integrated pest management approach. Integrated pest Management (IPM) is defined as the use of multiple tactics in a compatible manner to maintain pest populations at levels below those causing economic (aesthetic) injury while providing protection against hazards to humans, domestic animals, plants and the environment.

The IPM approach has a number of set elements or check points in dealing with pest problems. The City of Victoria Parks Department will adopt the following procedures to enact these IPM checkpoints.

IPM Checkpoint	Procedure
* Survey of pest problems	Compilation of existing data by IPM Coordinator
* Monitor current pest population levels	Use of Pest Identification Notice, initial report
* Assess thresholds; Equal to decision points whereby some form of control measure must be enacted	Consultation with IPM Coordinator
* Proceed using the best approach	Consultation with IPM Coordinator and fill out Pest Treatment Notice
* Monitor the results of the treatment to evaluate its success or lack thereof	Fill out Pest Identification Notice; follow up report

Pest Identification Notices are to be used for insects, mites, nematodes and disease problems with a separate form: 'Weed Identification Notice' to be used for weeds.

Park Supervisors will select 'scouts' from their crews to ensure that the pest identification and treatment notices are filled out by appropriate crew members.

The IPM Coordinator will arrange with Supervisors, Scouts and other appropriate staff for on site training with respect to the use of the Pest Identification, Weed Identification and Pest Treatment notices.

Treatment decisions, other than normal horticultural practices, shall be made in conjunction with the IPM Coordinator.

IPM strives for maximum use of naturally occurring control forces of the pest's environment, including weather, pest diseases, competition (antagonism) predators and parasites. Therefore, physical / cultural and biological / genetic control methods shall receive priority consideration for solving pest problems.

The judicious use of chemical pesticides are also acknowledged as part of the IPM system. The use of chemical compounds as tools in the competition among species predates the rise of humans. Plants have evolved chemical defenses against other plants (allelopathy) that are often expressed as root exudates or compounds leached from the leaves. Leaves or other tissues can produce chemicals that repel or damage organisms that attempt to feed on them giving rise to many of the botanically derived pesticides and pharmaceuticals used today.

Chemical control strategies shall be used only when a mix of other strategies is inadequate and will be employed judiciously to minimize the damage to beneficial organisms. Any treatment involving the decision to use a chemical pesticide must be made in conjunction with the IPM Coordinator and other appropriate personnel. All chemical applications must be conducted as specified in the B.C. Pesticide Control Act and The Guidelines for Pesticide and Procedures for the Management of Trees, Spray Policy; and Worker's Compensation Guidelines. The Pest Treatment Notice must be filled in by the person(s) conducting the applications.

iii) Parks Operations, City of Coquitlam: Integrated Vegetation Management Plan

Objective

The objective of Coquitlam's Vegetation Management Program is to control or suppress vegetation only when vegetation populations exceed a predetermined action threshold. Action thresholds are established for each component of the Vegetation Management Program.

Strategy

To promptly implement an effective combination of approved control options to suppress vegetation before maintenance standards are compromised.

Guidelines

- 1- No action will be taken until the problem is verified.
- 2- A problem must exceed the action threshold before a prescription is implemented.
- 3- All control options will be evaluated.
- 4- Prescriptions will utilize the most effective options with the least non-target impacts.
- 5- All actions will be carefully timed for maximum effectiveness and safety.
- 6- Results will be monitored and accurate records kept.
- 7- The program will be evaluated and periodically modified as necessary.

Vegetation Control Options

Vegetation is controlled or suppressed using the most effective combination of hand removal, mechanical cultivation, mulches, site modifications, competitive vegetation, cultural practices, herbicides, and physical control.

Vegetation Management Targets - Parks Operations

Thresholds are established and Management Strategy implemented for these sites.

Tree Hazards

Threshold: only dead, dying or diseased trees are pruned or removed (three-D policy),

Management: prompt response to all reports of dangerous trees, no pesticide.

Horticultural Displays

Threshold: Classification System determines maintenance standards (class 1 is highest standard and weed free, class 2 is moderate profile and relatively weed free, class 3 is passive natural areas with minimal maintenance).

Management: utilize combination of effective control options, selective use of pesticides.

Trails, Parking Lots, Hard Surfaces

Threshold: the surface type establishes priorities (low tolerance level for weeds on tennis courts and lacrosse boxes, higher tolerance on trails, bleacher pads, parking lots)

Management: allocate resources based on maintenance standards, utilize combination of effective control options, selective use of pesticides, experimental trials (heat treatment).

Sports Fields

Threshold: public safety, loss of function.

Management: combination of control options, pesticides only if public safety is at risk.

Vegetation Management Targets - Engineering Operations

Thresholds are established and Management Strategy implemented for these sites.

Ditching

Threshold: ensure vegetation does not impede drainage function, ensure maximum water carrying capacity.

Management: systematic ditching by Zone (3 year rotation), flail mowing of lane ditches, inspections / complaints identify non-scheduled work, no pesticides.

Brush Control

Threshold: traffic, pedestrian movement (minimum clearances), unrestricted visibility at intersections, public safety.

Management: systematic patrol of lanes, sidewalks (4X per year), prompt response to requests for improved visibility, combined use of trimming, chipping, low branching, removals, Good Neighbour Policy, no pesticides.

Road and Sidewalk Vegetation Control

Threshold: routine monitoring identifies control routes, weed population determines treatment options.

Management: selective pesticide use, chemical controls when weed population >50%, non-chemical controls when weed population <50%, remove / dispose dead vegetation, Good Neighbour Policy, experimental trials.

Good Neighbour Policy

Endorsed by Council Resolution, January, 1989

Combines letters and sign posting

Answers the relevant why, what, where, when, how questions

Spraying cancelled where objections registered

Objectors advised of their duty to maintain

Experimental Trials

Heat Treatment

Premixed, closed delivery herbicide system

Sidewalk Flushing

Municipal Regulations

Municipal Regulations

Boulevard Maintenance Bylaw: duty to maintain boulevards and clean sidewalks

Specified Area Charges Bylaw: establish annual taxable foot frontage charge

F) RECOMMENDED READING MATERIAL

i) Integrated Pest Management theory and practice

Daar, S., H. Olkowski, W. Olkowski editors, "**The IPM Practitioner**", Bio-Integral Resource Center (Berkeley, CA).

Since 1979, "**The IPM Practitioner**" has gained the respect of pest managers everywhere because of up-to-date, accurate reports on integrated pest management technology. This magazine is published 10 times a year and provides field reports on successful IPM techniques in horticulture, arboriculture, park maintenance, urban pest control, agriculture, forestry and rangelands.

The editors have field experience with urban IPM dating back to the 1970s in California. In 1991, they released a 715 pages book, "**Common-Sense Pest Control**", an easy-to-use reference book of IPM, covering every possible topic from the pests of the human body to the pests of indoor plants, including house pests, structural pests, garden pests and urban pests. Least-toxic methods of control are offered in every case.

The magazine "**IPM Practitioner**" is available through a subscription costing U.S. \$60.00 per year, from BIRC, P.O. Box 7414, Berkeley, CA, 94707. The book "**Common-Sense Pest Control**" is published by The Taunton Press in Newtown, CT and is found in specialized book-stores, or for U.S. \$39.95 plus \$3.00 from BIRC.

Flint, M.L. and S.H. Dreistadt editors, "**Integrated Pest Management for Landscape Trees and Shrubs**", Statewide Integrated Pest Management Project, University of California, 1994. 500+ pages.

In recent years, the University of California released a number of IPM Manuals for various agricultural crops. This title, to be released in 1994, will provide the same comprehensive, practical guide with the latest pest control information. The soft-bound book is illustrated with color photographs and goes in details over the description, damage and control of most landscape pests.

Previous titles were a good buy at U.S. \$22.00 plus freight. They are ordered from ANR Publications, University of California, 6701 San Pablo Avenue, Oakland, CA 94608-1239 or from agAccess, P.O. Box 2008, Davis, CA 95617.

Costello, R.A., D.P. Elliot, L.A. Gilkson, D.R. Gillespie, "**Integrated Control of Greenhouse Pests**", Ministry of Agriculture, Fisheries and Food (Victoria, B.C.), 1992. 19 pages.

A local publication about the use of predators and parasites against insect pests in greenhouses. The authors provide an extensive description of the biocontrol agents and the techniques to introduce them in new areas.

Available for \$10 from the Ministry of Agriculture, 32916 Marsall Road, Abbotsford, B.C.

Orton, D.A. and T.L. Green, "**Coincide. The Orton System of Pest Management**", Plantsmen's Publications (Flossmoor, IL), 1989. 190 pages.

This book uses degree-day information to correlate insect development with plant development. Many insects found in B.C. are listed: the vulnerable stage for treatment is listed along with indicator plants. The material is still in the experimental stages, but provides valuable information to pest managers in urban settings.

Available from Plantsmen's Publications, P.O. Box 1, Flossmoor, Illinois, 60422.

ii) Insect, Disease and Weed Identification

Gerber, H.S., N.V. Tonks, D.A. Ross, "**Insect and Mite Pests of Ornamental Shrubs and Shade Trees of British Columbia**", Ministry of Agriculture and Fisheries (Victoria, B.C.), 1983. 56 pages.

This manual was prepared by specialists working in British Columbia for the provincial or the federal governments. A description is provided of the hosts, the type of injury, the appearance and life history of most insect pests found in urban areas, illustrated with pictures. The control recommendations center around the use of pesticides. It is a good field book and a quick reference tool.

Copies are included with the package for the "Pesticide Applicator Certificate" from the Ministry of Environment. The B.C. Ministry of Agriculture in Cloverdale also provides copies.

Johnson, W.T. and H.H. Lyon, "**Insects that Feed on Trees and Shrubs**", 2nd Edition, Cornell University Press (Ithaca, NY), 1988. 556 pages.

Sinclair, W.A., H.H. Lyon, W.T. Johnson, "**Diseases of Trees and Shrubs**", Cornell University Press (Ithaca NY), 1987. 574 pages.

Highly acclaimed work, both titles are massive and well illustrated reference books. Organized like good field guides, they contain several color photographs showing external and internal damage of each insect or disease. Although there are no precise treatment recommendation, they are a starting place for identification, biological summaries and access to the literature.

These books are a must in the library of a serious pest manager, first because of the information provided, but also because of the relatively low price: around U.S. \$60.00 each plus freight. They are ordered through your favorite book store, or from Cornell University Press, 124 Roberts Place, Ithaca, New York, 14850 or from agAccess, P.O. Box 2008, Davis, CA 95617.

Coyier, D.L. and M.K. Roane editors, "**Compendium of Rhododendron and Azalea Diseases**", American Phytopathological Society (St Paul, MN), 1986. 65 pages.

Horst, R.K., "**Compendium of Rose Diseases**", American Phytopathological Society (St Paul, MN), 1983. 50 pages.

Chase, A.R., "**Compendium of Ornamental Foliage Plant Diseases**", American Phytopathological Society (St Paul, MN), 1987. 92 pages.

The three compendia, and many others from the American Phytopathological Society, are soft-bound books that provide a technical description of most diseases, supplemented with many photographs of signs and symptoms. They are easy to use in identifying plant diseases in the field and explain various methods of control. They provide good reference material for pest managers who wish to know more about a specific problem.

The compendia can be ordered from the Phytopathological Society at a cost of US \$25.00 plus freight at 3340 Pilot Knob Road, St.Paul, MN 55121, or from agAccess, P.O. Box 2008, Davis, CA 95617.

Whitson, T.D. et al, "**Weeds of the West**", University of Wyoming (Jackson, WY), 1991. 630 pages.

Hundreds of weeds are illustrated with three color photos and explained in a short text. A few B.C. weeds are not covered and there is no control option listed. But at U.S. \$20.00, it is a good buy.

The book is ordered from a book-store, or from agAccess, P.O. Box 2008, Davis, CA 95617. Printed at Pioneer of Jackson Hole, 132 West Gill St, Jackson, Wyoming 83001, U.S.A.

Finck, K.E., P. Humphreys, G.V. Hawkins, "**Field Guide To Pests of Managed Forests in British Columbia**", B.C. Ministry of Forests and Forestry Canada (Victoria, B.C.), 1989. 188 pages.

An excellent field guide for insects, diseases, abiotic injuries and animal damage to many native trees found in urban settings. Keys are provided to identify the pest problem based on visual symptoms. Each pest is described in details and color photographs complement the text. The information is from British Columbia, making it a good addition to any library.

Available from the Ministry of Forests, Protection Branch, 31 Bastion Square, Victoria, B.C.

Antonelli, A.L. et al., "**How To Identify Rhododendron and Azalea Problems**", Washington State University Cooperative Extension (Pullman, WA), 1991. 26 pages.

A pictorial presentation of insect, disease or nutritional problems. Available for U.S. \$3.50 from Extension Publications, Cooper Publications Building, Pullman, WA 99164-5912.

Philip, H. and E. Mengersen, "**Insect Pests of the Prairies**", University of Alberta (Edmonton Alb), 1989. 122 pages.

This soft-cover book provides a lot of information for many of the insects found in British Columbia. Control methods include cultural and chemical options. The book is purchased from the University of Alberta, Faculty of Extension, Corbett Hall, Edmonton, Alberta.

Various authors, "**Forest Pest Leaflets**", Canadian Forestry Service (Victoria, B.C.)

The Canadian Forestry Service has been publishing these leaflets since the 1970s and continually revise or add to the list. Each leaflet is produced for one specific insect or disease: it is usually 4 to 8 pages long and provides identification, hosts, damage and possible control.

Pests covered include the Silver-spotted tiger moth (1982), the Cooley spruce gall aphid (1977), the stem rusts of western Canada (1977), the ambrosia beetles (1985) and the Mountain pine beetle (1993). A list of the available titles can be ordered from the Pacific Forestry Centre, Canadian Forestry Service, 506 W. Burnside Road, Victoria, B.C.

Agrios, G.N., "**Plant Pathology**", Third Edition, Academic Press, Inc. (New York, NY), 1988, 803 pages.

Once a laboratory has clearly identified a disease on a plant, this book is the reference tool for more information on the pathogen. A standard text for university plant pathology classes. Available from a specialized book store, or from Academic Press, 1250 Sixth Avenue, San Diego CA, 92101-4311.

iii) Plant selection and Identification

Dirr, M.A., "**Manual of Woody Landscape Plants**", Fourth Edition, Stipes Publishing Company (Illinois), 1990.

Grant, J.A. and C.L. Grant, "**Trees and Shrubs For Coastal British Columbia Gardens**", Whitecap Books (Vancouver, B.C.), 1990. 456 pages.

Hitchcock, C.L. and A. Cronquist, "**Flora of the Pacific Northwest**", University of Washington Press (Seattle, WA), 1978. 730 pages.

Lauriault, J., "**Trees of Canada: Identification Guide**", National Museum of Canada (Ottawa, Ont), 1987. 551 pages.

Williamson, J.F. et al, "**Sunset Western Garden Book**", Lane Publishing Co. (Menlo Park, CA), 1990. 592 pages.

There are many good publications available for plant description and plant selection. Some cover North America, others cover only British Columbia. Some focus on commercial landscape plants, while others look at native plants. Some provide technical descriptions while others are field guides. In the end, the book to buy depends on the intended use.

The "**Manual of Woody Landscape Plants**" lists the ornamental characteristics of most landscape plants. The "**Trees and Shrubs for Coastal B.C. Gardens**" recommends plants for a variety of uses. The "**Flora of the Pacific Northwest**" is a key for taxonomical descriptions of native plants. The "**Trees of Canada**" provides keys and physical descriptions of many trees found in B.C. The "**Sunset Western Garden Book**" covers the West Coast of North America and describes growth requirements of most plants.

iv) Plant Care

Harris, R.W., "**Arboriculture: Integrated Management of Landscape, Trees, Shrubs, and Vines**", 2nd Edition, Prentice Hall Inc. (Englewood Cliffs, NJ), 1992. 674 pages.

This book is comprehensive and authoritative on the growth, response, use and care of woody plants in the landscape. The plant growth, the plant environment, and maintenance practices are evaluated in light of current horticulture and forestry research.

Available from the International Society of Arboriculture, P.O. Box GG, Savoy IL, USA.

Gershuny, G. and J. Smillie, "**The Soul of Soil: A Guide to Ecological Soil Management**", 2nd Edition, Gaia Services (Erle, Que), 1986. 109 pages.

Soil Improvement Committee of the California Fertilizer Association, "**Western Fertilizer Handbook**", 6th Edition, The Interstate Printers and Publishers, Inc. (Danville IL), 1980.

Many books on the market describe soil structure, soil nutrition and nutrient deficiencies. "**The Soul of Soil**" is a Canadian publication providing a good introduction to soils and fertility with an ecological perspective. It is available from Gaia Services, R.R. 3 Weedon, Erle Quebec.

The "**Western Fertilizer Handbook**" is more technical and comprehensive. It is ordered from the California Fertilizer Association, 2222 Watt Avenue, Sacramento California.

International Society of Arboriculture, "**Arborist News**", (Savoy, IL).

The International Society of Arboriculture is an American-based organization to which many professional arborists belong. The "**Arborist News**" is a magazine published since 1992. The Society also publishes the "**Journal of Arboriculture**" since 1975, a monthly compilation of scientific papers on plant health and tree care.

Both periodicals can be consulted in a specialized library, or can be ordered from the International Society of Arboriculture, Box GG, Savoy, IL 61874-9902.

v) Pest Control

Barnett, C. editor, "**Nursery Crop Production Guide for Commercial Growers**", Ministry of Agriculture, Fisheries and Food (Victoria, B.C.), 1993. 116 pages.

Production guides are produced on a regular basis by specialists of the Ministry of Agriculture for many different crops: greenhouse floriculture, field crop, berries, vegetables, tree fruits, etc. The Ministry also publishes "**A Gardener's Guide to Pest Prevention and Control in the Home and Garden**".

Both the Production and the Gardener's Guides describe most insects and diseases found in British Columbia, with cultural and chemical treatment options. Good reference texts, available from the different offices of the Ministry of Agriculture.

Koehler, C.S., "**Insect Pest Management Guidelines for California Landscape Ornamentals**", University of California, 1987. 82 pages.

A guide to pests of nearly 100 plants found in California, it provides chemical and non-chemical management options. Order from the Cooperative Extension section of the University of California, 6701 San Pablo Avenue, Oakland CA, 94608-1239 or for U.S. \$10 from agAccess, P.O. Box 2008, Davis, CA 95617.

Fisher, G. et al, "**Pacific Northwest 1992 Insect Control Handbook**", Oregon State University (Corvallis, OR), 1992. 308 pages.

Koepsell, P.A. and J.W. Pscheidt editors, "**Pacific Northwest 1992 Plant Disease Control Handbook**", Oregon State University (Corvallis, OR), 1992. 335 pages.

Burrill, L.C. et al, "**Pacific Northwest 1992 Weed Control Handbook**", Oregon State University (Corvallis, OR), 1992. 326 pages.

More pesticides are registered for use in the United States than in Canada, and these 3 Handbooks make an abundant use of them in the recommendations for pest control. Cultural and biological controls are also included as the authors favor an Integrated Pest Management approach.

The information is extensive and provides control recommendations for almost every type of crop and pest, including insects of ornamentals, insects of lawn, insects of fairway and industrial turf, diseases of most plants (listed by order of host), weeds of greenhouses, weeds of landscape and weeds of turf. The information is useful and practical for pest managers.

Revised annually, these handbooks are available from Oregon State University, Administrative Services, Corvallis, OR 97331-2119, or from Cooperative Extension, Cooper Publications Building, Washington State University, Pullman, WA 99164-5912.