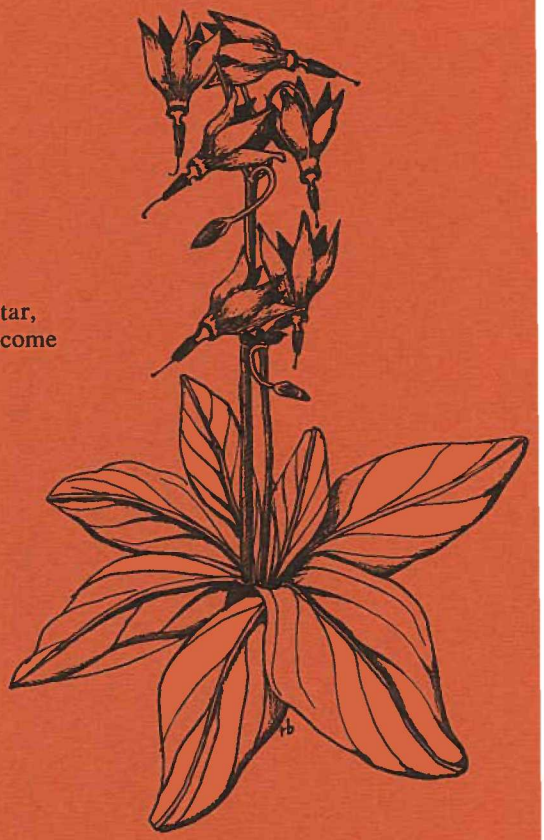
DAVIDSONIA

VOLUME 4 *NUMBER 1* *Spring 1973*

Cover

Flowering trusses of *Rhododendron macrophyllum*, one of British Columbia's rarest shrubs.

The common native Shooting Star, *Dodecatheon pulchellum*, a welcome harbinger of spring.



DAVIDSONIA

VOLUME 4 *NUMBER 1* *Spring 1973*

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Acknowledgements

The cover drawing and plate of *Rhododendron* are by Mrs. Leslie Bohm, the vignettes are by Mrs. Rosemary Burnham. Photographs of the ground orchids are by Dr. C. J. Marchant. The article on *Rhododendron macrophyllum* was researched by Mrs. Sylvia Taylor.

Terrestrial Orchids of Europe

CHRISTOPHER J. MARCHANT

In the fall of 1972, The Botanical Garden of The University of British Columbia had the good fortune to receive a donation of some hundred living plants of European ground orchids from Mr. M. Harbeck.

It is probably safe to say that the majority of plant lovers and even some botanists do not realize the potential of the wild ground orchids of temperate regions. In one sense, in view of their rarity and susceptibility to vandalism, this is a good thing! In contrast to the flamboyant, exotic finery of the myriads of tropical genera and species in cultivation, these diminutive terrestrial gems possess a delicate, pristine beauty and a charm of an altogether different quality. Many of them display in miniature all the elaborate texture and coloration of their tropical counterparts and are distinctly worthy of pride of place in a cool greenhouse or outdoor peat or scree garden.

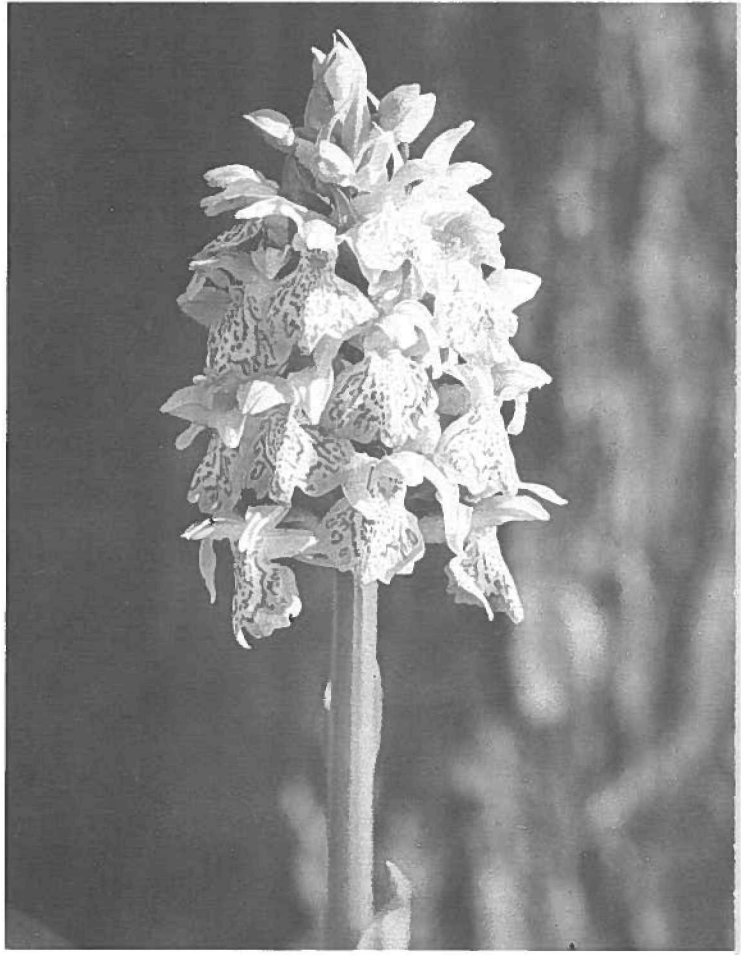
While it is true that many terrestrial orchids are at their best in natural drifts among their native vegetation, vast variety in flower shape and coloration is seen clearly and at best only in the closeness of a garden. Let us examine some of the variety of forms found within the group.

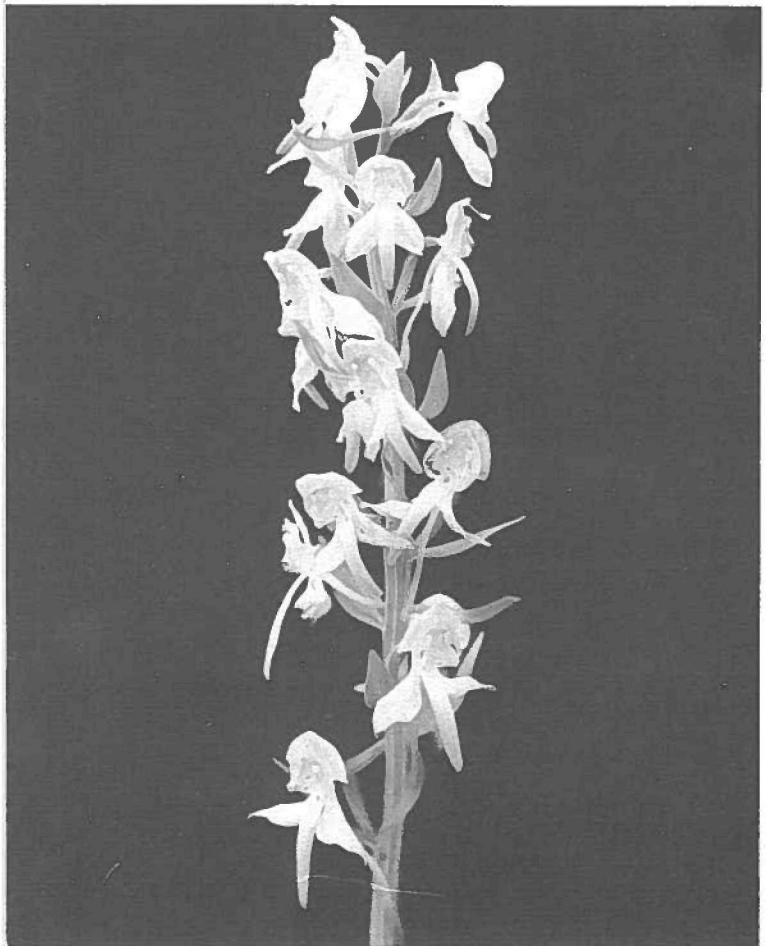
It should be recognized that much of the form of ground orchid flowers is dictated by their adaptations to pollination. Natural selections and gene complexes have operated on the interactions of insect pollinator and floral organs to produce some staggering aids to pollination. A majority of species have markings or shapes which act as direction indicators to the pollinating insects, guiding them to both the nectar glands and the pollen and stigma. Examples of markings are the dots and lines on the labellum of *Anacamptis pyramidalis* (Pyramid orchid) and *Dactylorrhiza* species.

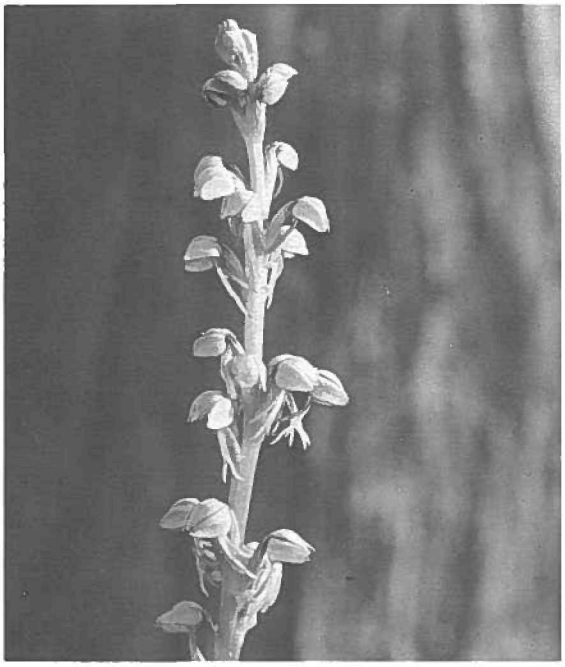
In addition, there is a whole range of fascinating shapes in the labellums of various genera, and these are often named after their resemblance to a familiar creature. Thus, we have the Lizard orchid, *Himantoglossum hircinum,* with extremely long filaments hanging from the dissected labellum; the Man orchid, *Aceras anthropophorum,* with hooded "head" and proportioned "limbs" the Military orchid, *Orchis militaris,* with pointed helmet; and, the Butterfly orchid, *Platanthera bifolia.*

One terrestrial orchid with particularly large flowers is the Tongue orchid, *Serapias lingua.* The flowers are few, violet with green speckles, and surrounded by violet-red tinted bracts held firmly and elegantly on the stems. From the front, the shape of the lower lip can be seen to give the flower its name.

In special cases, the forms and markings of the flower of a species, particularly of the lower lip or labellum, are an exact imitation of the female of an indigenous insect which pollinates the particular orchid species. The mimicry aided by flower scents is so exact that it attracts the male insect, which then attempts to copulate with the pseudo-insect and in doing so effects pollination by triggering the flower mechanism. Usually the orchid pollen contained in pollinia has structures which attach it to the insect's head or mouth parts, enabling its transport to another flower, and subsequent release of pollen on to the receptive female stigma. That evolution has been able to create such an elaborate mechanism is one of the wonders and mysteries of the natural world. Best examples of these insect mimicry flowers are the bee orchids and fly orchids. The most well-known in Europe are perhaps the bee orchids *Ophrys apifera, O. bertolonii* and *O. bombyliflora. Ophrys apifera* is quite common but very erratic in appearance, some years very numerous and others scarce. The flower has a brownish purple three-lobed lip with markings and pink outer segments. It likes a sloping location which is wet in winter and dry in summer.







Above: Two unusual ground orchids from Europe: left, *Aceras anthropophorum,* the Man Orchid; and right, *Serapias vomeracea,* the Long-lipped Serapias.

The second species, *O. bertolonii,* is rarer. It has a large black lower lip and clear pink outer segments with green veining. It is a southern European species. *Ophrys bombyliflora* is a very rare species of the southern Mediterranean region, North Africa, Greece and Crete. Its velvety black lower lip with pointed lateral lobes is closely reminiscent of a bumble bee.

The Fly orchid, *Ophrys muscifera,* is the most remarkable, and also one of the most widespread of European terrestrial orchids. The outer green and brown perianth segments stand out like limbs and antennae, while the velvety black to brown, blue-marked lower lip is distinctive. The effect is to give the impression that each of the widely spread flowers on the spike contains a fly clinging closely and drinking nectar.

There are a good many other European orchid genera, all of them attractive and delicate, often inconspicuous with thin small flowers. Among them are *Cephalanthera, Epipactis, Gymnadenia, Coeloglossum.* The genera *Spiranthes, Listera* and *Corallorhiza* will be familiar to botanists of the Pacific Northwest, not forgetting *Calypso bulbosa* which, in Europe, inhabits cold marshes and woods of Norway, Lapland and Northern Russia.

The majority of the group should grow well in the climate of British Columbia, and we hope they will establish successfully in the new Alpine Garden at the University.

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Opposite: Some European orchids: upper left, *Dactylorhiza occidentalis;* upper right, *Dactylorhiza traunsteineri,* Traunsteiner's Orchid; lower left, *Plantanthera cholorantha,* the Greater Butterfly Orchid; and lower right, *Dactylorhiza sambucina* × *D. maculata,* a cross between the Elderflowered Orchid and the Spotted Orchid.

Rhododendron macrophyllum D. Don ex G. Don

CALIFORNIA RHODODENDRON, CALIFORNIA ROSEBAY, WEST COAST RHODODENDRON, PACIFIC RHODODENDRON, PACIFIC ROSEBAY

Member of the Family Ericaceae

Natural Distribution

Rhododendron macrophyllum occurs from coastal southern British Columbia southwards to northern California, extending eastwards into the Cascade Mountains in Oregon. In British Columbia it is very rare and occurs only locally in Manning Park, the Skagit Valley, near Hope and on Vancouver Island. The shrub is at the northern limit of its range here.

Habitat

The habitat is characterized by cool summers and wet winters. *Rhododendron macrophyllum* is found usually below 1500′ in moist woods in the shade, and in ravines and openings in shady forests in areas free from lime. In the Skagit Valley it occurs on dry gravelly sites in association with semi-open stands of Douglas fir and lodgepole pine.

Description

An evergreen shrub, 3-10 (-26) feet tall with strong, stout stems and a shallow and fibrous root system. The bark is reddish-brown and scaly. Twigs are moderate to stout, puberulent when young, becoming glabrous with age. Pith rather small, roundish, somewhat coloured, continuous.

Buds solitary and sessile, often clustered, with several to many imbricate scales, upper buds usually ovoid, larger and the flower bud usually much enlarged, the lower buds successfully smaller and with fewer exposed scales.

Leaf scars alternate, low, shield-shaped and often notched at the top or the lowest linear, bundle trace 1, round or crescent shaped.

4

Leaves are alternate or somewhat whorled, shiny dark green above, paler beneath, 8-20 cm long, up to 6 cm broad, elliptic, acute at the base, apex obtuse or sharp pointed, entire, glabrous above, velvety-puberulent beneath, thick and coriaceous, slightly to strongly inrolled along the margin, midrib prominent, tapering into the petiole. Petiole 1-2 cm long, stout.

Flowers during May and June in British Columbia, April to July in other parts of the range. The inflorescence is a terminal, umbel-like cluster with up to 20 showy flowers. Calyx is minute, very shallowly 5-lobed, bell-shaped. Corolla is tubular-campanulate, 2.5-4 cm long, 3-5 cm broad, slightly irregular, pale pink to red to deep rose-purplish, occasionally white, upper lobes spotted red-brown inside, deeply 5-lobed, the lobes spreading, crisped-undulate. Stamens 10, unequal, the longer ones about the same length as the corolla and well-exserted, filaments sparsely pubescent or short hairy on the lower third to one-half. Anthers oblong, red-brown to purplish, 2-3 mm long, opening by pores at the apex. Style reddish-purple, as long as the corolla, stigma capitate or very shallowly lobed. Ovary 3 mm long, white silky hairy, superior, 5-celled with many ovules. Pedicels glabrous, up to 5 cm long.

Fruit a dry woody capsule, 5-locular, 5-valved, 1.5-2 cm long, rusty-puberulent and glandular, calyx persistent at the base. Seeds numerous, about 3 mm long, elongated, flat, wing-margined, brown, rather scale-like, embryo minute and cylindric.

Propagation

Seed can be sown as soon as ripe in a cool greenhouse, or stored in an airtight container in a cool place for up to a year. Spring sown seed may be germinated outdoors in a shady place. The seeds should be sown in pans or boxes filled with sandy peat which has been well-watered. Cover the peat with a layer of finely cut sphagnum, press down lightly and sow the seeds on top of the sphagnum. Place the seedlings in a cool frame the following spring and gradually harden off.

Semi-ripe or hardwood cuttings should root easily, especially after using a root-promoting hormone. Forms and varieties may be grafted on seedling understock of *R. macrophyllum*.

Transplantation

Easily transplanted with a good ball of soil around the roots in early spring or early fall may be satisfactorily planted later. All Rhododendrons are surface rooted, the top of the ball of soil should not be

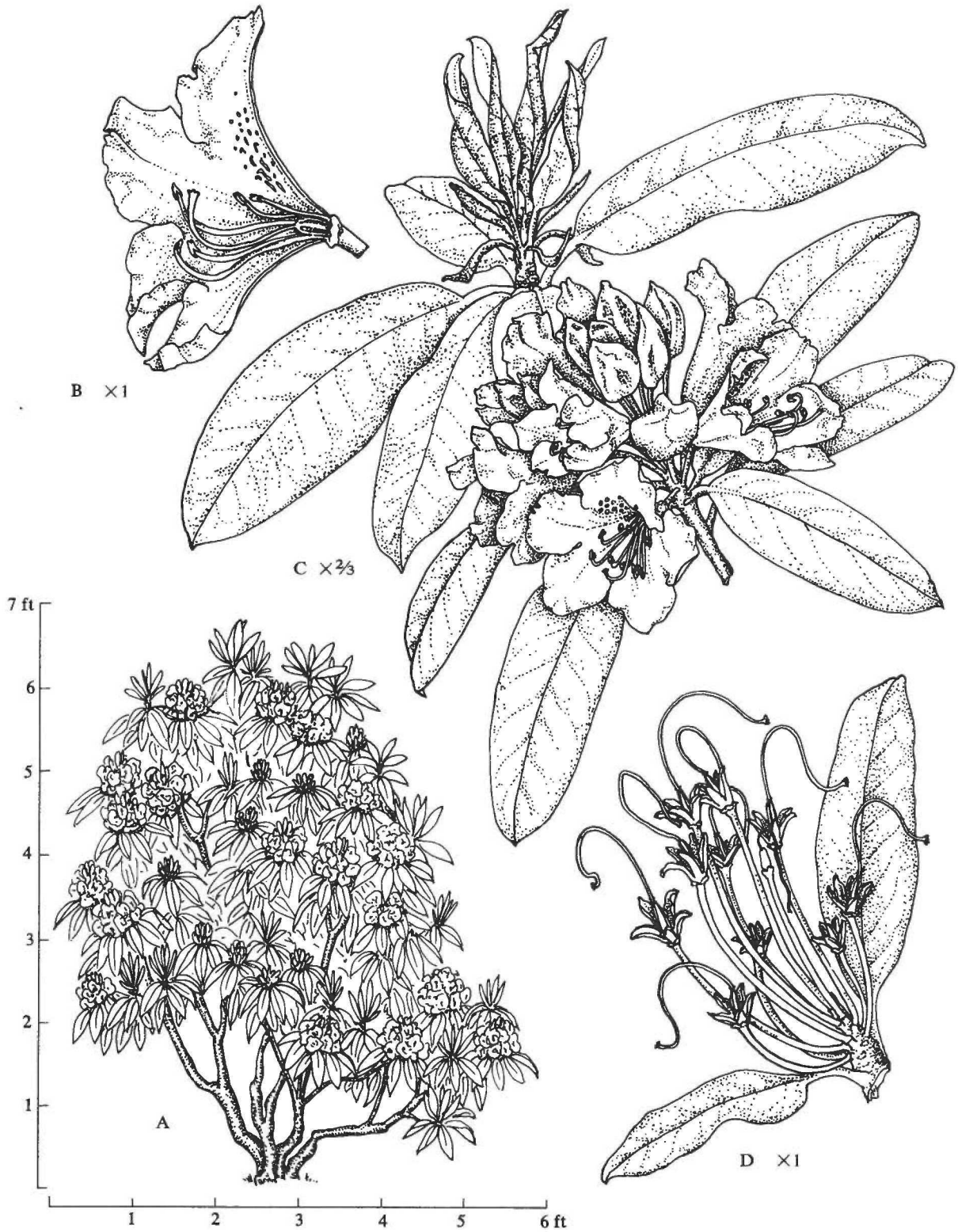

FIGURE 1. *Rhododendron macrophyllum*. A. Habit of shrub at flowering time, B. longitudinal cross-section of flower, C. flowering truss and expanded vegetative bud, D. fruiting inflorescence.

more than 1" below the surface and care must be taken not to damage the feeding roots. Water thoroughly and apply a mulch.

Conditions for Cultivation

The shrub is slow-growing. The recommended hardiness zone in Canada is Zone 8. The shrub needs a cool moist but well-drained acid soil in a position where it will be sheltered from long periods of hot sun or winter winds, and a cool moist climate with plenty of atmospheric moisture. The ideal soil has a pH 4.5-6.5 and contains plenty of humus. Permanent mulching with pine needles, peat moss, oak leaves or other acidic substances is excellent—this keeps the ground cool and moist, and maintains the acidity of the soil as the material decomposes. Water well just before the ground freezes in winter to ensure that the shrub has sufficient water for the winter. Fertilize occasionally in early to mid-spring with well rotted manure or a commercial fertilizer which leaves an acid residue in the soil. Ammonium sulphate is often recommended but must be used with care because too much will quickly kill plant tissues and it should be used only in the spring. Careful checking every two or three years of the pH of the soil, especially in foundation planting near brick buildings or where there is a lot of exposed concrete, is necessary because rain dissolves a certain amount of lime from these materials which then washes into the soil causing it to become more alkaline. Aluminum sulphate is added to the soil in the correct amount as determined by testing to correct this. Do not use a rake or hoe around the base of the shrub because of the shallow root system—if weeds occur, pull out by hand or cut them off without disturbing the soil. Picking off dead flower clusters as soon as they fade is good practice, though not absolutely necessary when the plant is large. Pruning is generally restricted to the removal of dead or diseased branches, or of those that give the plant an unbalanced appearance. Old plants may be encouraged to give good and vigorous growth by a severe pruning early in spring before growth starts.

Landscape Value

Rhododendron macrophyllum belongs to a group of plants of great landscape value where growing conditions are suitable, and it is regarded by many as the most handsome plant indigenous to the Pacific Coast. As an evergreen species, it is attractive throughout the year with showy flowers and handsome foliage. It is equally effective and desirable as a singe specimen or massed in a large group, although it could become too large for the small garden. It can become rather leggy and the site in the garden should be chosen with care. Like all rhododendrons, it is especially showy when backed by the dark green foliage of conifers, which also provides an ideal shelter. Especially useful for foundation plantings (but see above section) or large mass shrub borders in milder areas. *Rhododendron macrophyllum* is probably hardier and superior in other respects to many Asiatic species for cultivation west of the Cascades.

Availability

There is no known commercial source in Canada.

Varieties and Ornamental Cultivars

The form with smaller white flowers, smaller capsules and larger, more pointed leaves is sometimes distinguished as *Rhododendron macrophyllum* var. *album*. The Skagit Valley form appears to be drought resistant and to resent over-watering but has not been named.

The cultivar 'Albert Close' of either *R. maximum* × *R. macrophyllum* or *R. maximum* × 'Mrs. Jamie Fraser' origin is of medium height with blue-green leaves and flowers rose-colored with dark throat markings in compact conical trusses. It is a late bloomer and heat-tolerant.

'Oregon Queen', an *Azaleodendron* representing a presumed natural hybrid between *R. macrophyllum* and *R. occidentale*, was originally found in mountains of Oregon. This cultivar has unusually fine foliage and beautiful pink and yellow flowers. An exceptional unnamed dwarf form is cultivated in the Portland Test Garden. A double form found in woods near Fort Bragg, California has been propagated by John Drueckers of Fort Bragg, who said he would call it *'macrophyllum fastuosum'*. *R. macrophyllum* × *R. tephropeplum*, apparently crossed by Ben Lancaster, gave a very interesting plant—leaves about half size of *macrophyllum* with glossy texture of *tephropeplum* on a compact dwarfish plant that grows well in sun or shade. Flowers orchid-pink in a neat 3½"-4" truss. Roots readily.

Other Uses

The genus possesses astringent narcotic properties, produces hard close-grained compact wood which is sometimes used in turnery and for fuel. Seedlings of *R. macrophyllum* have been used as understock for grafted plants.

Diseases and Problems of Cultivation

Probably the most difficult problem is maintaining the necessary level of acidity in the soil, and testing every two or three years is a sound idea. Chlorosis or leaf yellowing is common when the soil becomes too alkaline or the shrub is planted too close to a cement wall. The plant is unable to absorb iron and thus becomes chlorotic. Treat the soil, or as a temporary measure, spray the leaves with an iron chelate.

Many rhododendrons may be killed when strong cold winter winds follow warm days in early spring. The damage may not be apparent until two or three weeks later when the leaves become brown, especially at the edges and near the tips. It is caused by an excessive loss of water by the leaves at a time when the roots are unable to obtain water from the soil. Can be prevented by growing the plants in a position where they will be sheltered from strong winter winds.

Rhododendrons should not be planted near black walnut trees or they may suddenly wilt and die, apparently due to toxins secreted by the roots of the walnut.

Occasionally woodpeckers may completely girdle stems up to 3" in diameter and the distal portion then dies. No effective repellent has been developed.

Some wasps bite holes in the leaves and chew them to make paperlike nests but no control is suggested.

The best way to keep rhododendrons free of insects and disease is to provide good growing conditions.

Insects:

1) *Brachyrhinus sulcatus* and *B. ovatus* 'Black vine weevil' and 'strawberry weevil'—adults feed on the leaves at night during spring and early summer cutting holes along the margins, sometimes devour the whole leaf except the midvein and large veins. The larvae feed on the roots and bark at the junction of the stem and root during the winter. If the stem is completely girdled by the larvae the plants will die, plants not completely ringed are usually badly crippled, lose most of their leaves or fail to make normal growth for several seasons or until a callus has formed over the damaged tissue.

Adult weevils can be killed by a foliage spray containing chlordane and the young forms by spraying the soil around the base of the shrubs.

2) *Stephanitis pyrioides* and *S. rhododendri* 'Lace bugs'—black and white sucking insects which feed on the undersides of the leaves. Their excreta appears as rather large brown sticky spots on the under side of the leaves while the upper surface is marked by numerous whitish specks.

Spray the leaf undersurface as soon as the eggs hatch in May, and repeat in summer and fall if additional lace bugs appear.

3) *Ramosia rhododendri* 'Rhododendron borer'—the larva of a clearwing moth which bores into the main stems leaving ugly scars and sometimes killing large branches.

Cut and destroy infected branches as soon as observed. Spray against the moths in May and June.

4) *Giardomyia rhododendri* 'Rhododendron tip midge'—newly developing leaves are rolled and their edges browned by small white maggots. New growth is stunted.

Spray the growing tips.

5) *Dialeurodes chittendeni* 'Rhododendron whitefly'—causes yellowish mottling on the upper surface of the leaves with a rolling of the margins. Young insects are greenish, almost transparent, very flat and oval in shape and produce much "honeydew" which provides nourishment for Black Sooty Mold as a secondary infection.

A 2% white oil emulsion has given good control in the Pacific Northwest, but it must be used only on cloudy days to avoid injury to the plant.

Diseases:

1) *Phytophthora cactorum* 'Dieback'—the terminal buds and leaves turn brown and droop as though in the winter condition. The stem shrivels and a canker is formed which encircles the twig, all parts above the canker then die. The same fungus causes lilac twig blight; therefore, the two genera should be well separated.

All diseased tips should be pruned out well below the infected parts and burned. Spray with fungicides as new leaves emerge and repeat two weeks later.

2) Leaf spots are caused by at least 7 different fungi. Keeping the plants in good condition will help to prevent the entrance of many of these.

3) *Phytophthora cinnamomi* 'Rhododendron wilt'—affects plants up to two or three years old, attacking roots and lower stems. The fungus thrives under high moisture conditions, high temperatures and less

acid conditions than rhododendrons prefer—destroy infected plants and adjust soil and general growing conditions before replanting.

4) *Armillaria mellea* 'Shoestring root rot' or 'Honey mushroom'—affects many species of trees and shrubs. Rarely attacks plants in good condition, ensure that the crown of the plant is exposed to the air so that the bark is well dried.

H. N. W. Toms (1964) lists only two diseases which have been found on wild *R. macrophyllum* in British Columbia—*Chrysomyxa piperiana* 'Rust' and *Exobasidium vaccinii* 'Red leaf'.

The generic name is derived from the Greek words *rhodon* for a rose and *dendron* or *dendros* for a tree. The name was first applied by the Ancient Greeks to the rose-flowered oleander *(Nerium oleander)* but was later transferred to these woody plants by Linnaeus in 1753. The specific name *macrophyllum* means with long or large leaves—the leaves were longer than any known at the time the original description was written. The type locality is "northwest coast of America" where it was collected by Archibald Menzies near Port Discovery in 1792 during Captain Vancouver's voyage.

This species is sometimes referred to as *R. californicum* Hook. because Don described the plant collected by Menzies as having white flowers whereas Hooker's description had pink flowers. However, there is only one *Rhododendron* on the West Coast to which the two names could apply so the earlier *R. macrophyllum* is retained.

Rhododendron macrophyllum is on the list of plants protected by the British Columbia Provincial Government and, therefore, the flowers cannot be picked, nor shrubs transplanted from the wild.

It is the State Flower of Washington.

As in many Ericaceae, the leaves contain a toxic substance which can kill livestock—they, however, usually avoid these plants when other forage is available. It is also toxic to humans (Kingsbury 1964), but there is some recent work which suggests that there might be a medicinal use for the toxic substance for the relief of high blood pressure (Leach 1967). The honey of certain species of Ericaceae, including some Rhododendrons, is also reputed to be toxic to humans.

Two other rhododendrons are native to B.C.—*R. albiflorum* is found in mountains where it is common on shady moist slopes near the timberline; *R. lapponicum* is a dwarf arctic plant found on mountain slopes in northern and northeastern B.C.

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Botanical Garden News and Notes

Alpine Garden Initiated—Tenders have been submitted and the contract let for the construction of the Alpine Garden component of The Botanical Garden. This will involve the transportation of some 2,000 tons of rock from the interior of B.C., landscaping on the site and planting.

Presentation—At the April meeting of The Alpine Garden Club of B.C., The Botanical Garden was presented with a 40-year old specimen of the rare *Thuja plicata 'filiformis'* of local natural origin.

Local Initiatives Program—Under the government-sponsored Local Initiatives Program, a group of 14 men are currently employed in the development of the B.C. Native Garden on The Botanical Garden site. The work includes scrub clearing, preparation of land and installation of plants.

Staff Activities—Three members of staff—Dr. Roy L. Taylor, Mr. Ken Wilson and Mr. David Tarrant—attended the annual meetings of the A.A.B.G.A. in Arcadia, California—Dr. Taylor was elected Vice President of the Association. In March, Dr. Taylor was elected President of the Biological Council of Canada, an association of biological societies representing some 5500 Canadian scientists.

British Columbia Landscape Plant Improvement Association—The Botanical Garden is well represented on the Board of Directors of the newly formed British Columbia Landscape Plant Improvement Association. Dr. John Neill is Vice President and Treasurer and Mr. Ken Wilson is Secretary. First task of the Association has been to establish a mother block of virus-free flowering cherry varieties at the University. These have been processed at the Canada Agriculture Plant Quarantine Station at Sidney, B.C., or have been imported from Prosser, Washington and East Malling. The organization has been set up on a non-profit basis, proceeds from the sale of budwood to local nurserymen going toward maintenance of the block. Some crabapple varieties have been included in the original planting. The Association, working closely with The Botanical Garden, will expand its activities to the testing and introduction of new plant material to the trade.

Botanical Garden Extension Programs—This spring The Botanical Garden continued its extension courses, "Gardening Through the Seasons." In Series I, 6 classes covering topics of immediate interest to the beginner attracted a total of 40 people. The Series II was extended to include two day-time courses as well as one evening course. The subjects given included propagation, pruning and rock gardens. A walking tour of the campus and a visit to a local nursery served as a visual means of the use and maintenance of plants in the garden. Practical demonstrations and some student participation were included in most classes.

The course "Gardening for Apartment Dwellers" of 4 classes given at the Vancouver Public Library, was extended to include a day-time course. A total of 232 registrants ascribes to its popularity and the need to have plant material in close association with people who do not have traditional gardens.

The 1972-73 fall and spring gardening instructional program had a total of 378 participants.

CLIMATOLOGICAL SUMMARY *

Data 1973	*January*	*February*	*March*
Mean temperature	36.90°F	41.45°F	43.15°F
Highest temperature	53.0°F	58.0°F	53.0°F
Lowest temperature	17.0°F	27.0°F	32.0°F
Grass Minimum temperature	8.0°F	12.0°F	21.0°F
Total rainfall/No. days with rainfall	7.32"/19	3.11"/12	3.00"/19
Total snowfall/No. days with snowfall	3.2"/3	nil	nil
Total hours bright sunshine/possible	60/265.39	88.2/278.24	107.7/361.16
Max. wind speed (m.p.h.) 1 hour/direction	20/SE	12/SE	15/SE
Mean mileage of wind at 3'	86.0	68.0	80.9
Mean mileage of wind at 40'	129.4	101.7	118.4

**Site: The University of British Columbia, Vancouver, B.C., Canada*
Position: lat. 49°15'29"N; long. 123°14'58"W. Elevation: 342.6'

Fritillaria lanceolata, the Chocolate Lily, is another harbinger of spring in British Columbia.

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