DAVIDSONIA

VOLUME 5 *NUMBER 4* *Winter 1974*

Cover

Western yellow pine, *Pinus ponderosa,* a conspicuous element of the dryland interior of British Columbia.

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ROSE TRIALS

KENNETH WILSON

The Botanical Garden recommends the following rose cultivars as having superior qualities for cultivation in the Vancouver, Lower Mainland areas. The recommendations are based on the results of at least two years of observations in the Rose Garden using the following criteria: length of flowering and repeat blooming qualities; petal count; growth habit; quality of flower and foliage, and overall attractiveness for general garden display. In the category, "Disease Resistant Cultivars", the recommendations are based on the plant's resistance to mildew, blackspot and rust. Cultivars which require special treatments to control disease infections have not been included. Only good standard cultural practices which can be carried out by the home gardener have been used in the trials. It must, however, be remembered that roses, unlike many other flowering plants, do require regular and frequent attention to achieve satisfactory growth and flower production.

ROSES FOR GENERAL GARDEN DECORATION

(T) Grows 5' high or more under normal cultural and weather conditions.

(S) Grows not more than 2' high.

* Exceptionally high rating.

WHITE

Hybrid Tea

Matterhorn (T)
*Pascali
White Masterpiece

Floribunda

*Iceberg

CREAM TO YELLOW

Hybrid Tea

Apollo
*Grandpa Dickson
King's Ransom
Ama Tsu Otome
Yellow Pages
Miabella

Floribunda

*Jan Spek
Friesa
Kiskadee

APRICOT-ORANGE

Hybrid Tea	*Floribunda*	*Grandiflora*
Fragrant Cloud	Fee (T)	Comanche (T)
Gypsy	Iced Ginger	
*Indian Chief	*Korbell	
Sutter's Gold	Korona	
Troika	Olympic Triumph	
Alexandra	Orangeade	

PINK

Hybrid Tea	*Floribunda*	*Grandiflora*
Bewitched (T)	Baby Sylvia	Camelot (T)
Bonsoir	*City of Leeds	Queen Elizabeth (T)
*Prima Ballerina	Gene Boerner	
	Liverpool Echo	
	Patricia Hyde (T)	
	Tip-Top (S)	
	Bridal Pink	

DEEP PINK

Hybrid Tea	*Floribunda*	*Grandiflora*
Kalahari (T)	Betty Prior	*Aquarius (T)
Mala Rubinstein	Marjorie Anderson	Mainzer Wappen (T)
*Miss All American Beauty	Nearly Wild	
Mullard Jubilee		
Reg Willis		
Fragrant Hour		

RED

Hybrid Tea	*Floribunda*	*Grandiflora*
*Ernest H. Morse	Aurora	Scarlet Knight
Fragrant Charm	*Europeana	
John Waterer	Franklin Englemann	
L. G. Harris (S)	Pye Colour (S)	
Red Devil	Tornado (S)	
Red Planet		

BICOLOURS AND BLENDS

Hybrid Tea	*Floribunda*
Brasilia	*Bonfire Night
Colour Wonder	Escapade
Granada	Little Darling (T)
Mr. Chips	Merlin
*Peace	Molly McGredy
Silent Night	Picasso
Tiffany	Princess Chichibu
	Sea Pearl
	Violet Carson
	Stroller (T)

LAVENDER-MAUVE

Hybrid Tea	*Floribunda*
Blue Moon	News
*Silver Star	

VERY FRAGRANT CULTIVARS

*Ernest H. Morse
Fragrant Charm
Fragrant Cloud
Mala Rubinstein
Matterhorn
Perfume Delight
Prima Ballerina
Red Devil
Red Planet
*Silver Star
Sutter's Gold
Tiffany
Troika
Fragrant Hour

RAIN RESISTANT CULTIVARS

Hybrid Tea

Bewitched
Brasilia
Colour Wonder
Ernest H. Morse
Fragrant Charm
Granada
Grandpa Dickson
Indian Chief
*Miss All American Beauty
Mr. Chips
Pascali
Peace
Silent Night
Troika
Yellow Pages
Ama Tsu Otome
Alexandra
Fragrant Hour

Floribunda

Bonfire Night
*City of Leeds
Europeana
Jan Spek
Korbell
Little Darling
Molly McGredy
Patricia Hyde
Violet Carson
Stroller
Orangeade
Kiskadee
Bridal Pink

Grandiflora

Queen Elizabeth
Mainzer Wappen

DISEASE RESISTANT CULTIVARS

Hybrid Tea

Bewitched
Blue Moon
Grandpa Dickson
*Miss All American Beauty
Pascali
Peace
Prima Ballerina
Red Devil
Red Planet
Silent Night
Silver Star
Yellow Pages

Floribunda

*City of Leeds
Iceberg
Iced Ginger
Jan Spek
Little Darling
Liverpool Echo
Sea Pearl
Violet Carson
Stroller
Kiskadee

Grandiflora

Comanche
Queen Elizabeth
Scarlet Knight
Mainzer Wappen

CULTIVARS WHICH PRODUCE SPECIMEN BLOOMS SUITABLE FOR EXHIBITION PURPOSES

Bewitched
Blue Moon
Bonsoir
Ernest H. Morse
Fragrant Cloud
Grandpa Dickson
Troika
Ama Tsu Otome
Fragrant Hour
Indian Chief
John Waterer
King's Ransom
Mala Rubinstein
Matterhorn
Mr. Chips
Mullard Jubilee
Pascali
Prima Ballerina
Red Devil
Reg Willis
Silver Star

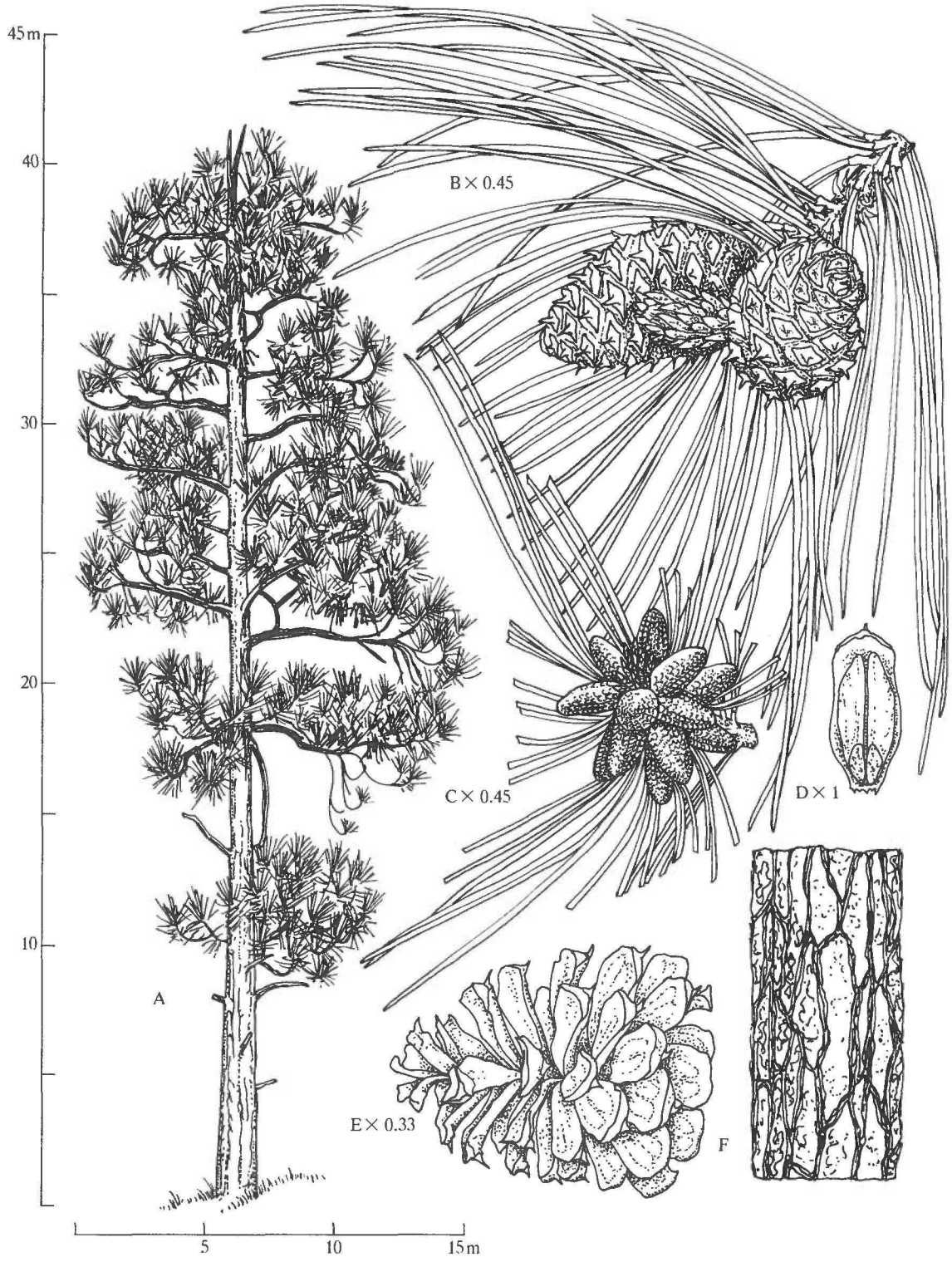

FIGURE 1. *Pinus ponderosa*. A. Habit of tree, B. female cones, C. male cones, D. female cone scale showing two seeds with wings, E. female cone expanded after seed dissemination, F. mature bark pattern.

Pinus ponderosa Dougl. ex Lawson & Lawson

PONDEROSA PINE, PINABETE, PINO REAL,
WESTERN YELLOW PINE, YELLOW PINE.

Member of Family Pinaceae

Natural Distribution

Pinus ponderosa occurs from south-central British Columbia south to southern California, eastwards to extreme southeastern British Columbia and through the Rocky Mountain states to the Dakotas, Nebraska, western Texas and northern Mexico. However, it is unexpectedly absent from a large area in the centre of this range. It is found mostly east of the Cascade crests but is present in a few localities in the Puget Trough in Washington, becoming more abundant west of the Cascades in Oregon. Reports of its occurrence in Baja California are probably erroneous (Duffield & Cumming, 1949). In British Columbia, the species is confined to the drier portion of the southern Interior, occurring as far north as Bridge River and to 50°45'N (Forster Creek) in the Kootenay-Columbia Valley. It occurs north to 51°30'N on eastern aspects in the Cariboo and then south on the eastern bank of the Fraser River to 50°00'N (Ainslie Creek). It is also present in the Skagit Valley.

Habitat

Pinus ponderosa grows at the lower levels of rather dry inland ranges, often forming pure but open park-like forests, on well-drained slopes or plateaus at 300-800 m and up to 1100 m on exposed southern slopes. It is often present as the most abundant tree in mixed coniferous stands. The best growth in British Columbia occurs on sandy loam soils. It prefers cool winters, warm summers and an annual total precipitation of 360-560 mm, although it will tolerate lower rainfalls. Ponderosa pine is not found in areas where severe winters are the norm, even if the other conditions are met, as it has a fairly low frost resistance. The pH of the soil where this pine occurs varies from (4.9-) 6.0-7.0 (-9.1). The texture of the soil and its moisture-retaining capacity is probably more important than soil nutrients for good growth of Ponderosa pine.

Description

A large, monoecious, evergreen tree, 20-60 (-75) m tall with a DBH of 60-250 (-400) cm and a crown width of 9-12 m. Trunks of isolated trees are usually large at the base but rapidly taper to a narrow pyramidal crown, whereas the trunk of a forest-grown tree is straight with little taper and with good natural pruning of lower branches. Typical trees have a spire-like crown, but in arid regions broader and often round-topped crowns may develop. Mature trees are often clear of branches for most of their height and the crowns tend to become flat-topped with a brushy appearance. The tallest tree known is one near Lapine, Oregon which is 70.7 m tall with a DBH of 445 cm. Trees are known to live to 500 years or more.

The root system consists of a well-developed massive tap root which generally persists throughout life, and profusely branched side roots which may extend as far as 46 m from the tree near the surface of the soil. The roots form a mycorrhizal association which benefits the tree.

The bark is thick (often 7-10 cm) in older trees, deeply furrowed and dark reddish-brown for about 80-100 years, gradually becoming cinnamon red and irregularly divided into large flat plates that freely scale off. The furrows have a resinous odour.

Twigs are short, stiff, generally pendulous and turned upward at the ends, many-forked and mostly whorled, appearing rather stout in proportion to the rest of the tree. Branchlets stout, thick, yellowish-brown or shining green at first becoming brownish and finally nearly black with age, glabrous when young, fragrant if broken, with a smell similar to that of orange peel.

Buds 1.2-2.5 cm long, oblong-cylindrical, acute, resinous, with closely appressed reddish-brown scales.

Mature needles show considerable variation but generally are widespreading or slightly deflexed, in small clusters of (2)3(4 or 5). They are spirally arranged along short lateral spur branches towards the ends of larger branches giving a tufted appearance. Needles are (10-)12-20(-26) cm long, 1.5 mm broad, yellowish-green to dark green, triangular, stout, flexible, stomatiferous on all three sides and not glaucous. The needles are persistent for 3-7 years, deciduous with spurs, more or less scabrous on margins, with a sharp, horny-pointed apex; resin ducts 2-5, medial; basal sheaths 6-20 cm long, persistent; spur branches originating in axils of small scarious primary leaves. Ponderosa pine has the longest needles of any pine in British Columbia and is the only 3-needled pine native to western Canada.

Wood quite soft, moderately strong, light red to yellowish-brown with nearly white sapwood, straight-grained, relatively lightweight, moderately resistant to decay, non-porous and rather resinous.

Cones appear in May to June on branchlets of the current year's growth. Female or ovulate strobili are deep reddish-purple or greenish, subsessile, more or less erect, single or paired to clustered in a lateral or sub-terminal whorl, consisting of many spirally arranged scales each bearing 2 pendent ovules. Male or staminate strobili are yellow to purplish, 2-3 cm long, cylindric, axillary and strongly clustered at base of branchlets, subtended by an involucre of 3-6 scale-like bracts. Microsporangia numerous, spirally arranged about a central axis, producing much pollen. The male cones disintegrate soon after pollen release, leaving a bare area on the branchlet.

Female cones are bright green or purple becoming reddish-brown with maturity, 7-15 cm long, 3.5-5 cm broad, elliptic to broadly ovate, subsessile, more or less horizontal or somewhat deflexed, woody, subterminal and solitary or in groups of 3-5. Scales are numerous, brown to yellowish-brown, about 30 mm long × 12 mm broad, thin, apex thickened or low pyramidal or more elongate in basal scales, umbo with stout somewhat triangular point or short prickle. Each scale spreading apart at maturity to release two seeds. Bracts smaller than and adnate to the scales. The female cone matures in late autumn of the second year and is not long persistent after seed release. Basal scales remain attached to the tree. Seeds are normally released in the fall.

Seeds 6-7 (-9) mm long, 5-6 mm broad, brownish-purple, more or less mottled, somewhat triangular in shape with acute apex; wing (2) 3-4 times as long as seed, dark brown, oblique at apex. Trees bear cones from the age of about 16 years to 350 years, with maximum production between 60-160 years. Heavy crops are produced at intervals of about eight years.

Propagation

Seeds germinate readily (70% success), but should be stratified for three months at 5°C before sowing in the spring.

Pinus ponderosa does not reproduce vegetatively in nature but can be propagated with difficulty from cuttings. Grafting has been used successfully for some varieties.

Seedlings do not grow well in dense shade. However, they do require plentiful moisture and humidity for the first year, although care should be taken not to over water.

Transplantation

Large plants cannot be transplanted successfully because of the long tap root. Best results are obtained by using nursery-grown trees.

Conditions for cultivation

The growth rate is slow during the first 2-7 years but is rapid thereafter. The recommended hardiness zone in Canada for *Pinus ponderosa* is Zone 2b. The tree thrives in a well-drained deep loamy sand which is not too

rich in organic matter; it will grow well in rather dry soils because of its drought resistant properties. The species is intolerant of shade and normal growth is inhibited by less than 40% full sunlight. It can grow to a height of 60 or 75 m with a crown width of 9-12 m, so it needs plenty of room to develop. Pruning of *Pinus ponderosa* is difficult and has been described as requiring an artist, otherwise the result is malformation. It is best to correct the form of a specimen by breaking out the centre bud from shoots projecting beyond the proper limits, thus inducing a more compact growth. A hedge may be sheared when the young shoots are half grown, in late spring or early summer. If it is necessary to remove branches, the cut must also remove the bolster at the base of the branch. The resinous exudate will prevent decay and the cambium soon covers the scar if the cut has been made properly.

Landscape Value

Pinus ponderosa is an excellent specimen tree for larger gardens and parks, but is definitely not suitable for a small garden as the rapid growth soon results in too large a tree. Although it is often recommended for hedges it is not desirable as trees need a considerable amount of light and therefore soon thin out in the centre. It is also a popular tree for a shelter belt.

Availability

Pinus ponderosa should not be transplanted from the wild as legislation restricting the movement of pines exists because of the prevalence of pine shoot moth. It is not readily obtainable from most nurseries.

Varieties and Ornamental Cultivars

Pinus ponderosa shows much variation over its range, with intergradation between many of the geographical races. It is generally divided into the typical Pacific Coast variety, var. *ponderosa,* and the Rocky Mountain form, var. *scopulorum. Pinus arizonica* and *Pinus jeffreyi* were once treated as varieties of *Pinus ponderosa,* and may still be listed as such although most taxonomists now consider them to be distinct species. Den Ouden (1965) lists a number of cultivars and forms, including var. *deflexa* cv. Kookhaas, f. *macrophylla* and cv. Pendula. Many of the others are now either rare or no longer found in cultivation.

Pinus ponderosa hybridizes infrequently with several other species of Pinus including *P. jeffreyi, P. washoensis* and *P. engelmannii.* The hybrids appear to lack the adaptive vigour of the parents.

Other Uses

Pinus ponderosa is one of the most important western pines in terms of lumber production. The wood is of great commercial value and is used for many kinds of general construction, interior finishes, furniture, boxes and crates. It is not strong enough for heavy construction and is too easily attacked by fungi to be used in contact with soil, although it is used for fences and pilings following treatment.

The Ponderosa pine is used in horticulture as understock for grafting other species and varieties of 3-5-needled pines.

The seeds are small, but are nutritious and rich in oil and are said to be pleasant to the taste, although some people consider them inedible because of the strong and bitter resinous flavour. They may be crushed or ground and then made into bread or biscuits with the addition of sunflower seeds.

Indians used the bark scales to make small hot fires which gave off no smoke and cooled rapidly — excellent for avoiding enemies! The cones are also excellent for a quick hot fire.

Pinus ponderosa was used by the Lillooet Indians to produce a poultice for burns, wounds and infections and was also a 'humanized' figure in their mythology. The Thompson Indians boiled the resin which is exuded along the stem, mixed it with melted bear's fat and used this ointment for sores and inflamed eyes. An ointment made of the best white "gum" melted with an equal quantity of deer fat, then cooked together in a pan, was used as a special treatment to cure old running sores on a prized horse or dog.

The Thompson Indians ate the cambium of young twigs and also the seeds, which were usually roasted. While washing, an Indian girl would stick four Ponderosa pine needles into the underarm flesh until it bled, simultaneously praying that her armpits and all her skin would always smell sweet. Washing with a decoction of the tops of *P. ponderosa* was believed to give a smooth and fair skin and an abundance of hair.

Diseases and Problems of Cultivation

The brittle limbs of *Pinus ponderosa* break easily under heavy snow, and needles drop if the tree receives too much shade. In nature small mammals such as mice eat the seeds and pocket gophers cause widespread mortality of seedlings.

At least 108 species of insects attack the Pacific Coast variety of the Ponderosa pine and almost 60 species attack the Rocky Mountain variety, but in cultivation most insect injuries and fungus diseases can be obviated or easily repaired by maintaining the trees in good vigour. The pine shoot moth is the most serious pest of all pines and specimens obtained from a nursery should be free of infestation, but care must be exercised to prevent future damage by this serious pest.

Origin of the Name

The generic name *Pinus* is the classical Latin name for the pine tree. The specific name *ponderosa* means heavy or ponderous referring to the bulky nature of the tree. The varietal name *scopulorum* means of cliffs, crags or projecting rocks, referring to the type of habitat.

Pinus ponderosa was first reported in 1802-1804 from the Missouri River by members of the Lewis and Clark expedition. David Douglas in 1826 found specimens growing near the Spokane River in eastern Washington and sent seeds to the Royal Horticultural Society of London in 1827. A tree was raised from these seeds in the garden of the Caledonian Horticultural Society. The first scientific description was by Lawson in 1846, based on specimens from Douglas. The type locality is "Spokane River, Washington."

Pinus ponderosa is the State tree of Montana.

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Index Seminum

The 1974 Index Seminum (Seed Exchange List) offered for distribution 227 taxa representing 43 plant families. The publication was distributed throughout the world to a total of 444 other Botanical Gardens, public institutions or individuals engaged in research projects. Of these, a total of 290 or 65% ordered seeds. We were able to fill requests for 3,825 packets of seed. As usual, most requests were for wild-collected seed of native plants. Leading in popularity were: *Fritillaria lanceolata* (93 requests), *Trillium ovatum* (53), *Dodecatheon hendersonii* (53), *Quercus garryana* (47), *Pinus contorta* (45), *Sorbus sitchensis* var. *sitchensis* (38), *Mimulus nanus* (35), *Cornus nuttallii* (35), and *Viola douglasii* (27).

Climatological Summary for 1974*

A review of the yearly total of rainfall and sunshine showed the weather to be about average when compared to that of the past fifteen years. The monthly totals, however, showed a somewhat different picture. In the first seven months of the year only June had below average rainfall, whereas the months of March and May recorded record rainfalls for the fifteen-year period. Conversely, August with 0.16" and October with 1.36" of rain were the driest for the same period. There was also a record number of hours of sunshine in September and October. In summary, it was a beautiful fall – good for Plants and Man.

Data	*October*	*November*	*December*
Mean temperature	51.30°F	43.85°F	41.65°F
Highest temperature	65.0°F	53.0°F	52.0°F
Lowest temperature	37.0°F	32.0°F	30.0°F
Grass minimum temperature	28.0°F	25.0°F	20.0°F
Total rainfall/No. days with rainfall	1.36"/9	7.83"/19	9.39"/25
Total snowfall/No. days with snowfall	0	0	0.8"/3
Total hours bright sunshine/possible	181.0/318.43	65.4/268.23	51.3/253.11
Max. wind speed for 1 hour/direction	13/NW	15/N & E	15/SE
Mean mileage of wind at 3'	63.4	78.7	88.2
Mean mileage of wind at 40'	87.3	116.3	128.1

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

The Western Sword Fern, *Polystichum munitum,* a fern of the Pacific Coastal forests. This fern provides a fresh green colour to the forest floor during the winter months.

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