

***Salix lucida* ssp. *lasiandra* Mulh. (Benth.) A.E. Murray**

Halkomelem (Island): x̣ẉálaʔaʔp

Halkomelem (Upriver): x̣áʔtsəpəʔp

Ucwalmicwts (Líl'wat): x̣ẉuʔl'-'az'

English Name: Pacific willow

Family: Salicaceae (Willow family)

Identifying characteristics:

Salix lucida (shining willow) has two subspecies in Turtle Island (North America). Pacific willow (ssp. *lasiandra*) is the western subspecies, and is a fast-growing tall shrub, shrub-tree, or small tree that can reach average heights of 11 meters (Douglas et al, 2000). It is the largest willow species in BC, and the BC record Big Tree from Coldstream in the North Okanagan is 17.1 metres in height, with a circumference at breast height of 5.94 metres (BC Big Tree Registry, 2019).

On mature trees, the trunks are furrowed with broad flat scaly bark plates that are grey or brown (Figure 1). Yellowish, brownish, or reddish twigs are brittle, shiny and fuzzy when young, becoming hairless with age.



Figure 1. Pacific willow – mature trunks and bark.

Pacific willow leaves (Figure 2), are 5 to 17 cm long, narrow, and have a glossy or shiny dark green upper surface (Douglas et al, 2000), with an orange-yellow mid-vein.

The simple leaves with finely-toothed leaf margins (Moore, 2003), are alternately arranged on the twigs, and are variable in that they may or may not be hairy or whitish on the underside, and may or may not have glandular dots at the top of the leaf stalks (Douglas et al, 2000). In other words, willow identification can be complicated and confusing.



Figure 2. Leaf and flower characteristics of Pacific willow.

Flowers are greenish catkins on short leafy shoots that bloom in the spring and are 1-2 cm in size (Douglas et al, 2000). Flowers are dioecious, having male (pollen catkins) and female (seed catkins) on separate structures.

Pollen catkins appear with the leaves and are 2-4 cm in length (Figure 3), while seed catkins can be slightly larger. Pollen is distributed primarily by gravity and wind, but pollen-seeking insects can also play a role. By summer, the fruit emerges as a yellow catkin covered with hair. The catkin contains capsules which open to release the seeds in fall (Douglas et al, 2000).



Figure 3. Male flowers showing pollen.

Distribution:

The Pacific willow (*ssp. lasiandra*) is native to western Turtle Island, and is found from Alaska, Yukon and the Northwest Territories south into BC and down the Pacific coast to California (Moore, 2003). “Lasiandra” means “wooly stamens”

The eastern range of this subspecies overlaps with the eastern subspecies (*ssp. lucida*) around the Saskatchewan – Manitoba border (Figure 4).



Figure 4. Natural distribution map for *Salix lucida ssp. lasiandra* (blue) and *Salix lucida ssp. lucida* (green).

Habitat:

Pacific willow thrives in well-drained moist to wet gravelly or sandy soils, typically near bodies of water including floodplains, stream banks, and clearings in the lower elevations of watersheds (Douglas et al, 2000). The plant does best in full sun (Moore, 2003). Pacific willow grows in association with other willows, red alder (*Alnus rubra*), and black cottonwood (*Populus balsamifera* ssp. *trichocarpa*).

Pests and Diseases:

Salix lucida is part of the willow family, which makes it susceptible to certain diseases. The main three diseases are crown gall, black canker, and blight (Moorman, 2016). Crown gall is caused by the pathogen *Agrobacterium tumefaciens* (Moorman, 2016). The symptoms include an enlarged portion of the stem or trunk close to the ground.

Black canker is caused by the pathogen *Phyalospora miyabeana* and symptoms include black areas on the leaf surface that may spread to woody tissue (Moorman, 2016). Pink spores in wet conditions are an indication of *Phyalospora miyabeana* (Moorman, 2016).

Blight is caused by the pathogen *Venturia saliciperda* in the willow family (Moorman, 2016). Blight turns leaves brown in spring, and the infected leaves fall. Brown spores can be spotted on infected willows (Moorman and Moorman, 2016).

Pacific willow can be heavily browsed by beaver in winter. We have experienced this activity on Logan Creek, losing live stakes as they grow enough to attract the attention of beavers who nip the stems off near ground level just as leafing out occurs.

Reproduction & Cultivation:

Pacific willow seeds are released in in summer when ripe and drop to the ground from the catkin (Douglas et al, 2000). In order for the seed to successfully germinate, the soils must be moist and continue to be moist throughout the growth from seed to seedling (Moore, 2003). Seeds may germinate within 12-24 hours of dispersal. Seeds contain chlorophyll and are ready to photosynthesize upon germination. The seed is only viable for a few days and does not have a dormant state; germination will occur in less than 48 hours if there is adequate moisture and light (Moore, 2003). There are about 25 seeds per gram (Rose et al, 1998). Sow in flats in a peat/perlite potting mix. After germination, transplant to individual pots and keep moist and in the shade for 3 – 4 months (Rose et al, 1998).

Vegetative propagation is done when the plant is dormant, from November to March when the leaves have dropped (Moore, 2003). Cuttings from one- to four-year-old wood should be 250mm long and 1.0 cm diameter. The terminal (top) end should be cut horizontally, and the basal (bottom) end cut with a 45° angle before inserting into potting soil if pre-rooting before planting. Willows can also be rooted by inserting cuttings (50-100cm) in a 20-litre bucket of water. Buds kept in the water will eventually root. Or, just plant dormant cuttings directly on site. Do not throw out the willow water!

Wildlife Value:

The Pacific willow is a valuable food for many species of wildlife including ungulates and mammals that eat the leaves and the young shoots (Moore, 2003). Beavers (*Castor canadensis*) use Pacific willow for dam building (Fryer, 2015). Additionally, the plant provides cover for animals and birds, as well as places for bedding, hiding and giving birth to young. Willow catkins produce pollen and nectar that attracts bees and other insect pollinators. Willows (*Salix* spp.) are food plants for the spiny elm caterpillar, the larval life stage of the mourning cloak butterfly (*Nymphalis antiopa*).

Ethnobotany:

Around the world, willow sticks are used for smoking meat, starting fires, for weaving objects such as baskets, and for clothing such as hats. In Halkomelem, Stl'atl'imx and other dialects, the name for Pacific willow means “firedrill” or “match plant”. The wood was dried and used directly as kindling, and as the “drill” in starting fires with friction (Turner, 1998). Baskets were made out of a combination of stems and bark that were intertwined (Moerman, 1998). Willow wood can be whittled to make whistles. The strong and flexible wood can be used to make bows (Turner and Bell, 1971).

On the Northwest Coast, willow branches are used by the Haisla to hang drying oolichans (Compton, 1993). Rope can be made by drop spindling willow fibre into 2-ply twine made from the inner bark, and then woven for nets or plyed again into 4-ply or stronger rope (Stewart, 1982; Turner, 1998). The reef net technology developed by the WSÁNEĆ (Saanich) Peoples used harvested Pacific willow that was manufactured into cordage and fish nets (Claxton and Elliott, 1994). Turner (2014, 2:175) notes that to make a reef net of about 10m², between 750 and 1,688 linear metres of willow shoots (1-3 cm diameter) would need to be harvested, twined, and then woven. After cutting, the trees would be left to regenerate in subsequent years (Turner, 2014, 2:191). Peeled willow wood is white, and pieces were carved into fish shapes and used as lures to attract salmon and cod (Stewart, 1982).

Kuhnlein and Turner (1991) have compiled and described the various Indigenous uses of Salicaceae for traditional food. As a food, the inner bark can be dried and then added to water to make tea. The inner bark can also be ground to create bread (Moore, 2003). Globally, willows have a long history of traditional medicinal use due to the presence of salicin, a natural anti-inflammatory and pain killer. In many cultures, including Indigenous communities in BC, Pacific willow was prepared as a decoction to treat sore throats, colds, dandruff, sore muscles, and general pain. It was taken orally, or applied directly to the skin where the wounds or pain occurred (Moore, 2003).

In Bella Coola, “six sticks about a foot long charred, and pulverized on a stone. A teaspoonful of the powder taken in a cupful of cold water for diarrhoea. Said to effect a cure in two or three hours” (Smith, 1929:53).

Interaction and Human Interest:

The Pacific willow is a very useful plant for humans. It has a fondness for wet areas, and can grow close to water. Additionally, the large form of the willow gives adequate shade in the summer heat, and is particularly useful for shading and lowering the temperature of fish-bearing waters.

Tolerance for wet soil allows this plant to be used in bioengineering projects as a natural, living stream bank stabilizer (Labbe, 1998). Riparian area management programs have used *Salix lucida* and its subspecies extensively, and have been very effective (Labbe, 1996). Darris and Lambert (1993) note that the cultivar 'Nehalem' was especially selected for riparian repair and restoration work (2-9m, and easily recognizable by shiny, orange or distinctly yellow twigs, and hairless leaves and stems).

Willows are economically practical for ecosystem repair projects; you can harvest branches for free in the winter, prune them to suitable stake lengths, and then pound cuttings into the ground where they will form roots and continue to grow and mature. Living fences can be created by installing willow posts and weaving willow wands between the posts (wattling), whether utilitarian for stream bank repair, or for artistic expression.

Hanna Van Aelst (2019), an artist and basket maker in Ireland has published a series of useful tutorials on how to prepare willow branches for weaving, and how to weave willows into baskets and structures. YouTube has numerous videos of artists crafting willow into beautiful and utilitarian objects.

Recipe:

Willow Water (for starting and strengthening new plants)

Willow contains a natural rooting hormone that stimulates root growth called indolebutyric acid (IBA). This compound is highest in the growing tips, which aids the easy rooting of a broken willow branch travelling downstream and lodging in a muddy bank.

You can mimic this by making a willow tea and using it to water cuttings or new plants. Place cuttings from the tips of new shoots in cold water and let sit for several weeks. Keep the water topped up (the cuttings will likely root and you can plant them). Save the willow water and use it to water new plants, or to water in and reduce transplant shock.

There is another benefit to watering new plants with willow tea. According to research, salicylic acid (SA) is involved in a plant's systemic acquired resistance (Klessig et al, 2018). Plant parts attacked by disease or insects can increase SA production which triggers natural defense responses throughout the plant. Plants with SA can convert SA acid into a volatile compound that can warn other nearby plants of pest or disease threats. Scientific evidence verifies the long-standing gardening practice of using willow water on new cuttings. Willow water on any plant will aid rooting and strengthen plant defense mechanisms.

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Figures:

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