

Riparian FACTSHEET



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SELECTING PLANTS FOR AGRICULTURAL RIPARIAN PLANTINGS

Selecting plants for riparian (streamside) planting in agricultural areas can be a daunting task. Which species will grow well in your area? Which will provide minimal interference with agricultural operations? Which species will provide the most benefit for the riparian area in terms of ecological functions? Which species are easy to establish and grow quickly (see also *Riparian Plant Acquisition and Planting*, Factsheet No. 6). This factsheet provides answers to these and other common questions associated with plantings in riparian areas.



Riparian Vegetation Functions:

Riparian plants provide a variety of functions that are beneficial to terrestrial animals, fish and aquatic life as well as to agricultural operations:

- Controlling erosion;
- Slowing flood flows and protecting adjacent agricultural fields;
- Recharging aquifers;
- Filtering sediment;
- Trapping excessive nutrients and farm chemicals;
- Providing shade and food for aquatic organisms;
- Providing shelter and cover for fish as well as terrestrial animals; and,
- Maintaining biodiversity.

Providing a healthy riparian vegetation cover benefits everyone. However, these free ecosystem services can only be enjoyed if we look after our riparian areas. Ensuring that your riparian area is healthy and that the vegetation cover is functioning properly will help with a variety of farm issues. When selecting species to use in riparian plantings, be sure you only pick species that grow locally as these will perform best on your site.

Factors to Consider in the Selection of Planting Material

- **Diversity of plant species in riparian areas**
 - Riparian plantings should contain a mix of different plant species in order to achieve the various desired functions.
 - Some plants have stronger roots; grow faster; tolerate drier conditions; provide more shade; or take up more nutrients.
 - A diversity of plant species produces a riparian area which is more capable of dealing with change (floods or drought) and resisting problems (invasive plants).
- **Invasive plants**
 - Non-native invasive plants, or weeds, that could become a problem in watercourses or agricultural fields should not be planted.
 - For example, reed canary grass can out compete and prevent the establishment of shade producing woody species.
 - Please note that some native plants can be invasive in other regions of the province. (See Factsheet # 7 for information on Weed Management.)
- **Insects and diseases**
 - Plant material selected should be free of disease and insects to prevent transfer to upland commercial crops.
 - Some types of vegetation can harbour diseases and should be avoided. For

example, Black Hawthorn is a host for Fire Blight, a serious threat to commercial apple and pear industries.

- **Shading of stream water**
 - Select trees and shrubs that either lean over the water or are tall enough to produce a long enough shadow to reach the stream.
 - Bushy shrubs, such as willows, can be effective in producing shade over watercourses.
- **Streambank erosion**
 - **Root type:** the best protection of stream banks against the erosive power of stream water is a mix of plants with differing types of root systems. For example, one of the strongest mixtures is a combination of sedge and willow. The willow provides deep roots for anchorage and the sedge provides very strong fibrous roots near the surface.
 - **Green-up:** After major work in and around streams there is often a large amount of bare soil. It is very important to seed these bare areas with a seed mix that will germinate and grow quickly providing 'Green-up' protection of the soil from heavy rains and floods. Care must be taken, however to avoid establishing a dense cover that will compete with the planted woody species. Use of native sedges (transplanted from adjacent areas) can be an effective means of controlling erosion along the edge of slower moving streams.
- **Deciduous vs. Coniferous trees:**
 - Deciduous and coniferous trees have different characteristics which makes them suitable for differing functions. Deciduous trees usually grow faster and provide more shade during the critical summer months. Deciduous trees also provide more small organic debris but they tend to be shorter-lived.
 - Conifers keep their leaves through the winter providing winter wind and snow drift protection. Planting conifers under a canopy of deciduous species can be an effective means of ensuring the long term stability of the riparian ecosystem.
 - Conifers are the preferred species for production of large woody debris- if one

of the objectives is to enhance stream habitat in future years.

- **Restrict access**
 - Thorny riparian species can act as a 'living fence' to restrict access of people and animals. The most commonly used species for this purpose in BC is Black Hawthorn (*Crataegus douglasii*).
- **Small organic debris (falling into the water)**
 - Plant selection should include species that drop leaves, fruit and insects into the water, which contributes to fish food.
- **Wildlife value**
 - Plants can be chosen for riparian plantings to either encourage or discourage wildlife. For example, shrubs and trees that produce berries will encourage birds. However, farms that are already having problems with bird predation on crops should avoid these plants.
- **Nutrient interception**
 - One of the functions of riparian plantings is the interception of nutrients from the farm. One of the best performers in this function is cottonwood. Other selections worth considering are the willows, red-osier dogwood and aspen.
- **Moisture requirement**
 - Plants that are adapted to the dry areas of the province should be used in these areas. Similarly, if summer irrigation is not available, selection of plants that are adapted to dry conditions is crucial. (diagram of stream- wetter closer to stream, uplands drier)
- **Agroforestry potential**
 - Various shrubs and trees can be used for agroforestry purposes, generating both habitat values and potential income. (See Factsheet #7 Integrated Riparian Management and Tables 1-3 this factsheet).

Shrub Species:

A variety of shrub species are appropriate for riparian plantings. Shrubs are generally less than 10 m tall when mature and usually multi-stemmed. Many shrubs have the advantage that they can be propagated with cuttings, which is inexpensive. (See Table 1: summary of shrub species, ecology, and agroforestry potential).

Red-osier Dogwood:

Red-osier dogwood (*Cornus stolonifera*) is an important riparian shrub that is found throughout BC. Red-osier dogwood provides forage for ungulates and the fruit provides food for birds. The stems and roots provide important structural elements in riparian forests with the stems often arching to the ground to take root again. The dense thickets of red-osier dogwood that develop in this manner provide an effective stabilizing element on streambanks.



Red-osier Dogwood

Willows:

Many willow (*Salix* spp.) species occur in British Columbia, and many of these are important riparian species. Willows are often the initial plants to establish on gravel bars and streambanks. As pioneering species, willows make ideal plants for riparian restoration. They form important forage for moose as well as providing a shrubby vegetation layer that is important for bird nesting and cover. Willow roots are very strong and help to knit streambanks together. The stems slow floodwaters allowing rich sediments to be deposited on the banks. Willows can help protect streambanks from erosion. The flexible stems can withstand flooding while the dense root systems hold the soils in place.



Balsam Willow

Red Elderberry:

Red elderberry (*Sambucus racemosa*) is an excellent plant for riparian planting. The flowers attract insects that provide food for fish. Birds and bears eat the fruit while the foliage provides shade during hot summer days but is absent in the winter when some light on the streams is helpful for aquatic productivity.



Red Elderberry

Pacific Ninebark:

Pacific ninebark (*Physocarpus capitatus*) is an excellent riparian restoration species for coastal areas. It also occurs in the wetter areas of the Kootenays. It tends to be found in the drier portions of the riparian area.



Pacific Ninebark

Salmonberry:

Salmonberry (*Rubus spectabilis*) can provide good riparian cover on moist rich sites. It is easy to propagate (like raspberry canes) and spreads well. The root crowns can be readily divided during the dormant season. The flowers are visited in the early spring by hummingbirds while the fruit is eaten by a variety of birds and animals.



Salmonberry

Thimbleberry:

Thimbleberry (*Rubus parviflorus*) is an excellent species for riparian planting. It grows well in the rich moist soils of riparian areas throughout the province. The large green leaves, the white flowers and the edible red fruit make this species a very attractive plant. The fruit is widely eaten by wildlife while the flowers are visited by pollinating bees and other insects. Thimbleberry can be planted right to the edge of the water, although it will not persist in areas that are regularly flooded. It prefers partially shaded sites.



Thimbleberry

Oceanspray:

Oceanspray (*Holodiscus discolor*) is a beautiful riparian species. The clusters of flowers that give this plant its common name provide forage for bees and other pollinating insects while the seeds are important winter food for small birds. Insects using oceanspray may drop into streams, providing food for fish. Oceanspray is not found in northern British Columbia and should not be used in



Oceanspray

areas where it is not naturally found. Oceanspray can be planted in the upper riparian areas where conditions tend to be drier than near the water.

Hardhack:

Hardhack (*Spiraea douglasii*) is a shrub commonly found in open riparian areas where they form tall thickets of wiry stems. The stems are generally multi-branched and have large terminal clusters of small pink flowers that form spires. The leaves are toothed toward the tips with undersides that are whitish with prominent veins. It can be harvested and planted as cuttings through the range of moisture regimes found in riparian areas in BC.



Hardhack
DND, 2006

Saskatoon:

Saskatoon (*Amelanchier alnifolia*) is commonly found in drier areas although it will grow along streams in coarse soils. The fruit of this species are edible and are used in some areas for jams, jellies and pies.



Saskatoon

Wild Roses:

There are a wide variety of wild roses that occur in BC. These shrubs can be used in riparian restoration to add colour, provide food for birds and small animals and, in dense plantings, the thorny stems can be used to prevent cattle from accessing the riparian area.



Prickly Rose

Wild roses provide excellent habitat for nesting songbirds while the roots and stems protect the streambanks from erosion. Wild roses can be planted as understory species under taller willows and trees like alder and cottonwood. Wild roses tend to do best in slightly drier portions of riparian areas.

Indian Plum:

Indian plum (*Oemleria cerasiformis*) is a shrub or small tree (1.5-5 m tall) with smooth, purplish-brown bark, and is one of the first woody plants to bloom in the spring. The leaves are pale-green, broadly lance-shaped, and smooth-margined. The flowers are in small clusters, bell-shaped, and greenish to white in colour. The small long fruits are pink to blue-purple (when ripe) and are edible but rather bitter. Indian plum is found in dry to moist open woods, along roadsides, and along streambanks at low elevations.



Indian Plum
Rousseau, 2006

Black Twinberry:

Black twinberry (*Lonicera involucrata*) fruit are eaten by a variety of wildlife and birds. These plants are easily established and spread well. They should be planted on moist, nutrient rich sites in partial shade. Black twinberry will grow well on streambanks and in seepage areas where there is ample moisture.



Black Twinberry
© Br. Alfred Brousseau, Saint Mary's College

Highbush-cranberry:

Highbush-cranberry (*Viburnum edule*) grows well on wet to moist streambanks and fresh, nutrient rich swamps. The flowers are visited by a diversity of insects while the fruit are eaten by wildlife. Highbush cranberry can be used in riparian plantings in low numbers to increase diversity and thus ecosystem stability.



Highbush-Cranberry

Mock-orange:

Mock-orange or syringa (*Philadelphus lewisii*) tends to be found in drier areas on the upper banks of streams and river where rocky coarse soils create dry conditions. It is an excellent plant for the high



Mock-orange

banks in the Ponderosa pine and drier Douglas-fir zones.

Silverberry:

Silverberry (*Elaeagnus commutata*) is an important nitrogen fixing riparian species. It can grow in low nutrient soils such as sandy gravels common along Interior streams. It tends to favour mesic to dry sites and is an excellent choice for the upper riparian areas where sandy soils make conditions too droughty for other riparian species.



Silverberry

Sedges, Rushes and Grasses:

Sedges, Rushes and Grasses:

Sedges, rushes and grasses form the fabric of many riparian ecosystems. The dense fibrous root systems of these species prevent erosion while the aboveground portions of these plants filter sediment, nutrients and pollutants from water draining from upland areas. The rhizomatous nature of many grasses, sedges and rushes allows plugs of these species to be collected from established stands (never collect more than 10 percent of any stand) and transplanted into the riparian restoration area.



Beaked Sedge

Deciduous Tree Species:

Deciduous trees provide summer shade and small organic debris to watercourses.

Alder:

Alders (*Alnus* spp.) are among the most important riparian species ecologically. There are three alder species that occur in British Columbia and all three associate with bacteria that can fix atmospheric nitrogen and make it available to plants. This nitrogen often finds its way into streams, providing an important nutrient in otherwise nutrient poor streams. Mountain alder (*Alnus*

incana) occurs east of the Cascade Mountains. Red alder (*Alnus rubra*) occurs west of the Cascades while Sitka alder (*Alnus viridis*) is common throughout southern British Columbia



Sitka Alder

Douglas Maple:

Douglas maple (*Acer glabrum*) is an excellent riparian species that has lovely bright red leaves in the fall. This shrubby maple is found in dry to moist sites up to the subalpine



Douglas Maple
© 2004 Robert Sivinski

Big-leaf Maple:

Big-leaf maple (*Acer macrophyllum*) is an important riparian species along many coastal streams. It is an excellent choice for coastal riparian restoration as it grows quickly, provides abundant shade and has strong soil binding root systems. The flowers of big-leaf maple are visited by a variety of insects while the biomass created by the leaves each fall provides essential organic matter to streams. The wood from big-leaf maple is light and strong.



Big-leaf Maple

Paper Birch:

Paper birch (*Betula papyrifera*) is a beautiful tree that can provide an effective addition to any Interior riparian restoration project. The bark and wood of paper birch continues to be widely used in the Interior. The leaves and fruit provide important organic additions to streams while the roots help hold the stream bank soils in place.



Paper Birch

Black Hawthorn:

Black hawthorn (*Crataegus douglasii*) is a versatile riparian species with fruit that provides important winter food for many birds and thorns that can provide an effective “fence” to



Black Hawthorn

keep cattle out of riparian areas. Black hawthorn grows best in moist clay soils. Note that there are both interior and coastal varieties of this species and local plants should be used to achieve best results in establishment. An English species (*C. monogyna*) should be avoided, as it is becoming a problem weed in some areas.

Pacific Crabapple:

Pacific crabapple (*Malus fusca*) is an excellent species for use in riparian restoration where access by cattle is unwanted. The sharp thorn-like spurs will deter the movement of all but the most determined animals. The flowers of Pacific crabapple are pollinated by a variety of insects that also pollinate cultivated fruit trees. The fruit is eaten by birds.



Pacific Crabapple

Cottonwood:

Cottonwood (*Populus balsamifera*) trees are found in riparian areas throughout the province. Cottonwood trees grow quickly and provide shade to aquatic systems. They are considered by some to be “weed trees”. However, they provide ecological structure and as they get older, the massive limbs are used by eagles and heron colonies for nesting and perching. The extensive root systems of cottonwood trees hold riparian soils in place and when they fall into the stream, they provide habitat for fish and aquatic organisms. Cottonwood trees provide a cover for the growth of conifers and often later successional spruce and cedar trees can be seen growing under a canopy of cottonwood trees.



Cottonwood

Locally Useful Riparian Species:

There are a variety of other species that can be useful in riparian plantings where site conditions are different. For instance, in areas that have deep organic soils such as peat bogs, species such as scrub birch (*Betula nana*) and Labrador tea (*Ledum groenlandicum*) can be useful.

The key to determining the appropriate plants to use is to look at the species that are growing in similar areas. In some cases, species such as grasses and sedges can be all that is needed to provide stability while in others, deep rooting woody species are best. It all depends on the local site conditions. Consult with local or regional stewardship and watershed groups, federal and provincial agencies for technical advice on locally useful or appropriate riparian species.

Table 1: Riparian Shrub Species

Riparian Plant Species	Description ¹	Ecology	Region ¹	Propagation
Shrub Species				
Red Osier Dogwood* <i>Cornus stolonifera</i> (<i>C. sericea</i>)	1 - 6 m (C) 1 - 4 m	Moist soil, streamside areas. Valley bottoms to mid elevations.	C SI, N	Bareroot, container, cuttings, seed
Willow <i>Salix</i> spp.	Shrubs grow 3-8 m	Very tolerant. Common along streams. Can withstand short periods of inundation.	C, SI, N	Bareroot, container, cuttings
Red Elderberry* <i>Sambucus racemosa</i>	1 - 5 m	Streambanks, moist clearings, shaded forests	C, SI, N	Bareroot, container, seed
Pacific Ninebark <i>Physocarpus capitatus</i>	3-4 m	Wet areas, edges lakes/ streams. Low to middle elevation.	C	Bareroot, container, cuttings, seed
Salmonberry* <i>Rubus spectabilis</i>	To 4 m	Moist to wet places, stream edges. Low to sub-alpine elevations.	C	Bareroot, container, cuttings, seed
Thimbleberry* <i>Rubus parviflorus</i>	0.5 - 3 m (C) 0.5 - 2 m	Open sites, streambanks, seepage areas.	C SI, N	Bareroot, container, seed
Oceanspray <i>Holodiscus discolor</i>	To 4 m	Dry to moist open sites. Low to middle elevations.	C, SI	Bareroot, container, cuttings, seed
Hardhack (Pink Spirea) <i>Spiraea douglasii</i>	0.5 - 1.5 m	Streambanks, lake margins. Low to middle elevations	C, SI, N	Bareroot, container, cuttings
Saskatoon* <i>Amelanchier alnifolia</i>	1 - 5 m	Dry to moist open forest, well-drained soils	C, SI, N	Bareroot, container, seed
Prickly Rose <i>Rosa acicularis</i> * Nootka Rose <i>Rosa nutkana</i> *	To 1.5 m To 3 m	Floodplains, clearings, open sites. Low to middle elevations.	SI, N C, SI	Bareroot, container, cuttings, seed
Indian Plum* <i>Oemleria cerasiformis</i>	1.5 - 5	Found along streams and in fairly open areas.	C	Bareroot, cuttings, seed
Beaked Hazelnut* <i>Corylus cornuta</i>	1- 4 m	Moist, well-drained sites, streamside habitats.	C, SI, N	Bareroot, container, seed
Sitka Mountain Ash* <i>Sorbus sitchensis</i>	1- 4 m	Open forest, streambanks	C, SI, N	Bareroot, container, seed

Notes:

* denotes fruit-bearing species

¹ Regions: C: Coastal, SI: Southern Interior, N: Northern

Table 1 cont.: Riparian Shrub Species

Riparian Plant Species	Description ¹	Ecology	Region ¹	Propagation
Shrub Species				
Black Twinberry* <i>Lonicera involucrata</i>	0.5 - 3 m (C) 0.5 - 2 m	Moist forest, clearings, streambanks.	C, SI, N	Bareroot, container, cuttings, seed
Highbush-Cranberry* <i>Viburnum edule</i>	0.5 - 3.5 m (C) 0.5 – 2.5 m	Moist forest, streambanks. Low to middle elevations.	C SI, N	Cuttings, seed
Mock Orange <i>Philadelphus lewisii</i>	Up to 3m	Variety of habitats. Moist, well-drained sites to open, dry soils.	C, SI	Bareroot, container, cuttings, seed
Red Huckleberry* <i>Vaccinium parvifolium</i>	Up to 4 m (C) To 2 m (SI)	Forest edges, rich soils. Low to middle elevations.	C, SI	Bareroot, container, cuttings, seed
Silverberry (Wolf-Willow) <i>Elaeagnus commutata</i>	1 - 4 m	Dry sites, sandbars, disturbed areas	SI, N	Bareroot, container, seed

Notes:

* denotes fruit-bearing species

¹ Regions: C: Coastal, SI: Southern Interior, N: Northern

Table 2: Riparian Deciduous Tree Species

Riparian Plant Species	Description ¹	Ecology	Region ¹
Deciduous Tree Species			
Red Alder <i>Alnus rubra</i>	Up to 20 m	Moist forests, streambanks, floodplains. Lower elevations.	C
Sitka Alder <i>Alnus crispa ssp. sinuata</i> <i>Alnus viridis ssp. sinuata</i>	Shrub or small tree 1-5 m	Moist sites, along streams, clearings and seepage areas.	C SI, N
Vine Maple <i>Acer circinatum</i>	Shrub or small tree 1- 8 m	Moist to wet sites. Low to middle elevations.	C
Douglas Maple <i>Acer glabrum</i>	Shrub or small tree to 10 m	Dry ridges to moist, well-drained sites. Low to middle elevations.	C, SI, N
Bigleaf Maple <i>Acer macrophyllum</i>	Up to 35 m	Dry to moist sites. Low to middle elevations	C
Paper Birch <i>Betula papyrifera</i>	Up to 30 m	Moist, well-drained sites, floodplains.	C, SI, N
Black Hawthorn* <i>Crataegus douglasii</i>	Up to 10 m (C) To 8 m (SI)	Moist, open areas, streamsides. Low to middle elevations.	C, SI
Pacific Crabapple* <i>Malus fusca</i>	2- 12 m	Moist woods, edges of water. Low to middle elevations.	C
Black Cottonwood* <i>Populus balsamifera</i>	To 50 m (C) To 40 m	Moist to wet sites, floodplains. Low to medium elevations.	C SI, N
Trembling Aspen* <i>Populus tremuloides</i>	Up to 30 m	Moist, open forest to edges of dry grassland. Shade intolerant.	SI, N
Choke Cherry* <i>Prunus virginiana</i>	Shrub or small tree 1 - 4 m	Open forests, grassland, clearings.	SI, N
Cascara* <i>Rhamnus purshiana</i>	To 10 m	Fairly dry to wet, shady sites.	C, SI

Notes:

* denotes fruit-bearing species

¹ Regions: C: Coastal, SI: Southern Interior, N: Northern

Table 3: Riparian Coniferous Tree Species

Riparian Plant Species	Description ¹	Ecology	Region ¹
Coniferous Tree Species			
Western Hemlock <i>Tsuga heterophylla</i>	Up to 60 m (C) 30 - 50m (N)	Fairly dry to wet sites. Shade tolerant. Low to middle elevations	C, N
Western Red Cedar <i>Thuja plicata</i>	Up to 60 m (C) to 40 - 50 m	Moist to wet soils, shaded forest. Low to medium elevations	C SI, N
Douglas Fir <i>Pseudotsuga menziesii</i>	Up to 70 m (C) 25 -35 m (SI) Up to 50m (N)	Wide variety of sites. Low to mid elevations.	C, SI, N
Ponderosa Pine <i>Pinus ponderosa</i>	15 – 30 m	Dry valleys, low elevations	SI
Western White Pine <i>Pinus monicola</i>	Up to 40 m	Moist valleys to fairly open and dry slopes.	C, SI
Lodgepole Pine <i>Pinus contorta</i>	20 – 25 m (SI) To 40 m (N)	Variety of soils and drainage conditions.	SI, N
Sitka Spruce <i>Picea sitchensis</i>	Up to 70 m	Often on moist, well-drained sites. Low to medium elevations	C
Black Spruce <i>Picea mariana</i>	10 – 15 m	Cold, wet forests of valley bottoms.	SI, N
Engelmann Spruce <i>Picea engelmannii</i>	25 – 40 m	Variety of sites, floodplains, seepage areas	SI, N
White Spruce <i>Picea glauca</i>	20 – 35 m	Well-drained, moist soils floodplains.	SI, N

Notes:

¹ Regions: C: Coastal, SI: Southern Interior, N: Northern

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