Agriculture and Agri-Food Canada
Agriculture et Agroalimentaire Canada

Trees and Shrubs for Agroforestry on the Prairies

Adapted species available through the Prairie Shelterbelt Program

Canada

Photo Credits
All photographs reproduced in this publication are used by permission of the rights holders.
All images, unless otherwise noted, are copyright Her Majesty the Queen in Right of Canada.
Photograph sources are identified by initials running alongside the photograph.

BL: Copyright, Ben Legler
DH: USDA-NRCS Plants Database / Herman, D.E., et al. 1996. North Dakota tree handbook. USDA-NRCS ND State Soil Conservation Committee; NDSU Extension and Western Area Power Administration, Bismark.
ES: Erl Svendsen
GI: Garth Inouye
JL: Janna Lutz
PF: PFRA Image Library
TP: Tricia Pollock

For additional copies of this publication or to request an alternate format, please contact:

Agriculture and Agri-Food Canada
Prairie Farm Rehabilitation Administration & Environment Branch
Shelterbelt Centre
PO Box 940
Indian Head, SK S0G 2K0

Telephone: 866-766-2284
Facsimile: 306-695-2568

Email: agroforestry@agr.gc.ca

Electronic version available at: http://www.agr.gc.ca/shelterbelt

Cat. No. A98-4/8-2008E-PDF
ISBN 978-1-100-10927-5
AAFC No. 10771E

Aussi offert en français sous le titre:
Arbres et arbustes pour l'agroforesterie dans les Prairies
Espèces adaptées disponibles par l'entremise du Programme des brise-vent des Prairies

PRINTED IN CANADA
IMPRIMÉ AU CANADA

25% post-consumer content

Table of Contents

Explanation of Icons

Farmyard Shelterbelt
for protection of a yard, residence or other buildings

Livestock Shelterbelt
for protection of livestock and livestock facilities; also odour control

Field Shelterbelt
for soil erosion control of cultivated fields and for protection of crops

Wildlife Planting
for improvement of wildlife habitat, including enhancement of field shelterbelts

Roadside Shelterbelt
for snow control along roads or lanes; also for privacy and dust and noise reduction

Riparian Buffer
to buffer between agricultural land and bodies of water, including floodplains and wetlands

Caragana

Caragana arborescens

‘ROSS’ CARAGANA, SIBERIAN PEASHRUB

Height: 5 m (16 ft.)
Spread: 3 m (10 ft.)
Recommended Spacing: 0.3 m (1 ft.); 1 m (3 ft.) if planted under plastic mulch
Growth Rate: moderate
Lifespan: 50 years+
Note: will not tolerate poorly drained sites
Origin: introduced from Siberia
Not available for wildlife plantings or riparian buffers

Photo Credit: TP

Caragana is a multi-stemmed shrub that grows best on well-drained sites in full sunlight. The seed strain ‘Ross’, developed through the AAFC-PFRA Agroforestry Division’s Tree Improvement Program, is very drought tolerant. It will not tolerate prolonged flooding. Caragana is a legume which fixes atmospheric nitrogen, grows well on nutrient poor soils and has a high competitive ability. Yellow pea-like flowers appear in early spring followed by pods forming in late June or July. As they ripen, the pods crack and burst, spreading the seed which germinates quickly. The root system is non-suckering. However, on most sites if caragana is not maintained it will spread by seed.

Recommended to be planted as an outside row in farmyard and livestock shelterbelts, single row field shelterbelts, mixed with other species in single or multiple row shelterbelts or roadside plantings. Caragana is a very dense shrub that controls ground-level winds and traps snow very effectively. In addition, it is a source of nectar and pollen for bees and other insects.

Photo Credit: PF

Photo Credit: TP

Photo Credit: TP

Choke Cherry

Prunus virginiana var. *melanocarpa*

BLACK-FRUITED CHOKE CHERRY, WILD CHERRY

Height: 7 m (23 ft.)
Spread: 3.5 m (12 ft.)
Recommended Spacing: 1 m (3 ft.)
Growth Rate: moderate
Lifespan: 50 years+
Note: susceptible to black knot disease and prairie tent caterpillar infestations
Origin: native
Available for all planting types

Photo Credit: PF

Choke cherry is a medium to tall shrub that performs well on moderately well-drained sites over a wide range of soil textures. Best growth occurs on open and sunny sites, but some shade is tolerated. The leaves are typically dark green; occasionally plants with dark purple leaves naturally occur. Long, white flower clusters appear in early June, developing into small, pea-sized, crimson or black, astringent but edible (that is, with enough sugar) fruit in July to early September.

In farmyard and livestock shelterbelts, plant choke cherry as an outside row or as a single roadside row to trap snow and control erosion. Occasionally used as a single row in field shelterbelts, choke cherry is most often combined with other species in single or multiple row shelterbelts to increase diversity. Planted for wildlife habitat or ecological purposes, choke cherry provides cover and food for a variety of birds and other wildlife. The fruit is an important fall and winter food source for birds, but can also be made into syrup, jelly and wine. It is also a good source of nectar and pollen for bees and other insects. In riparian plantings, the deep woody roots help stabilize soil, control erosion and protect water quality.

Photo Credit: PF

Photo Credit: TP

Photo Credit: PF

Farmyard Field Roadside Livestock Wildlife Riparian

Hawthorn

Crataegus spp.

HAWTHORNE, MAY-APPLE

Height: 4 m (13 ft.)
Spread: 3 m (10 ft.)
Recommended Spacing: 1 m (3 ft.)
Growth Rate: moderate
Lifespan: 40 to 50 years
Note: susceptible to cedar apple rust and pear slug infestations
Origin: native to Canada
Available for all planting types


Photo Credit: PF

Hawthorn is a tall, multi-stemmed shrub. It grows best in deep loam to clay loam soils, but will also have adequate growth in poorer soils. Full sun is ideal, but some shade is tolerated. Showy white flower-clusters bloom in May to July followed by small, red or orange-yellow apple-like fruit (haws). Use caution when working around this plant: the stems and branches are armed with long, 2 to 6 cm (1 to 2 in.) stout sharp thorns. Seedlings that are shipped to applicants may be either *C. arnoldiana* or *C. rotundifolia*, depending on availability.

Planted as an outside row for farmyard plantings or as a single row for roadside plantings, hawthorn controls erosion and traps snow. It can be planted as a single row field shelterbelt or added in with other species in single or multiple row shelterbelts to improve diversity. Hawthorn is also recommended for use in riparian buffers to reduce streambank erosion and protect water quality. In wildlife plantings, it provides excellent cover and food for birds and mammals: the fruit is valuable as it is held late into the year and is eaten by many species. Despite the thorns, hawthorn can be a valuable browse species for deer. The flowers are a spring pollen and nectar source for bees and other insects.


Photo Credit: TP


Photo Credit: TP


Photo Credit: TP

Hedge Rose

Rosa x hybrid

ROSE

Height: 2 m (6.5 ft.)
Spread: 2 m (6.5 ft.)
Recommended Spacing: 1 m (3 ft.)
Growth Rate: fast
Lifespan: 30 to 40 years
Origin: hybrid of native and introduced roses
Only available for wildlife plantings and riparian buffers


Photo Credit: PF

Hedge rose is adapted to a wide variety of soils and moisture levels. It suckers freely and will form a dense and gradually spreading hedge. Single pink to crimson blossoms appear in June, followed by dark red hips.

In wildlife plantings, hedge rose provides excellent nesting, loafing and winter cover for many thicket-dwelling birds. The hips are a favoured food of sharp-tailed grouse and pheasants; the shrubs are browsed by whitetail and mule deer. The flowers are a summer pollen source for bees and other insects. Recommended also for riparian plantings, the deep, woody roots help stabilize streambanks, prevent erosion and protect water quality.


Photo Credit: PF


Photo Credit: TP


Photo Credit: TP

Wildlife

Riparian

Red Elder

Sambucus racemosa

RED-BERRIED ELDER

Height: 3 m (10 ft.)
Spread: 2 m (6.5 ft.)
Recommended Spacing: 1 m (3 ft.)
Growth Rate: fast
Lifespan: 30 years
Note: may experience winter dieback
Origin: native to Canada
Only available for wildlife plantings and riparian buffers

Photo Credit: PF

Red elder grows well in loamy, moist soils; it is not considered drought tolerant. It grows best in full sun, but will tolerate part shade as well. Large, white flower clusters are produced in early spring, followed by large clusters of small, red or orange, fleshy berry-like fruit. Winter dieback is common; however regrowth is rapid and lush.

Recommended for use in wildlife plantings, red elder provides cover and food for many wildlife species: the fruit is eaten by birds, squirrels and other rodents while the twigs may be lightly browsed by wild ungulates. In riparian plantings, its dense roots and rhizomes stabilize soil and control erosion on moist sites such as streambanks. The flowers are a spring pollen and nectar source for bees and other insects.

Photo Credit: TP

Photo Credit: PF

Photo Credit: TP

Wildlife

Riparian

Red-osier Dogwood

Cornus serica (Syn. *C. stolonifera*)

DOGWOOD, RED WILLOW

Height: 2.5 m (8 ft.)
Spread: 2 m (6.5 ft.)
Recommended Spacing: 1 m (3 ft.)
Growth Rate: moderate
Lifespan: 30 years
Origin: native
Available for all planting types

Photo Credit: PF

Red-osier dogwood tolerates a wide range of soils, performing well on moderately wet soils and surviving occasional flooding. It grows best in the open but will survive in up to 75% shade. White, flat topped flower clusters appear in early June, followed by small, white or light blue, persistent fruit.

Planted as an outside row in farmyard shelterbelts, as a single row roadside shelterbelt, or in a multiple row shelterbelt, dogwood reduces soil erosion and traps snow. Dogwood is also recommended for wildlife habitat plantings; provides dense cover for small mammals and birds; is a preferred browse species of deer and rabbits, and provides summer food for robins, cedar waxwings and game birds. In riparian buffers, its shallow and extensive root system helps stabilize streambanks. The flowers are a spring pollen and nectar source for bees and other insects.

Photo Credit: TP

Photo Credit: DH

Photo Credit: TP

Farmyard Field Roadside Livestock Wildlife Riparian

Sea Buckthorn

Hippophae rhamnoides

'INDIAN SUMMER' SEA BUCKTHORN, SEABERRY, SANDTHORN

Height: 5 m (16 ft.)
Spread: 3.5 m (12 ft.)
Recommended Spacing: 1 m (3 ft.)
Growth Rate: moderate
Lifespan: 30 to 40 years
Note: suckers profusely; can be difficult to establish; does not tolerate poorly drained or shady sites; suitable for saline or nutrient poor soils
Origin: introduced from Eurasia
Not available for riparian buffers


Photo Credit: PF

Sea buckthorn is a thorny shrub that prefers well-drained, light to medium loamy soils in full sun. The seed strain 'Indian Summer', developed through the AAFC-PFRA Agroforestry Division's Tree Improvement Program, is tolerant of drought, and nutrient poor soils, the latter due to its ability to fix atmospheric nitrogen. In contrast, sea buckthorn is sensitive to flooding and will not grow in wetlands or areas subject to prolonged flooding. Small yellow flowers appear in early spring before the long, 3 to 8 cm (1 to 3 in.), narrow, silver-green leaves are formed. Small berries are clustered around the stem and are ripe when yellow or orange in late August to early September. Plants produce either male or female flowers, with fruit produced only on the female plants.

Plant sea buckthorn as an outside row in farmyard or livestock shelterbelts; as a single row or in multiple row field shelterbelts; or as a roadside shelterbelt. The fruit is a good source of vitamin C, vitamin E, other vitamins, antioxidants, and other nutrients. Although harvesting can be a challenge, mature shrubs can yield 3 to 5 kg (6.5 to 11 lb.) fruit for processing into food (jam, jelly), pharmaceuticals, cosmetics, beverage, dyes and more. Sea buckthorn also provides valuable wildlife cover and the persistent fruit is eaten by winter birds such as chickadees, pheasants and grouse. The flowers are an early pollen and nectar source for bees and other insects.


Photo Credit: TP


Photo Credit: TP


Photo Credit: PF

Silver Buffaloberry

Shepherdia argentea

THORNY BUFFALOBERRY, BULLBERRY

Height: 4.5 m (15 ft.)
Spread: 3.5 m (12 ft.)
Recommended Spacing: 1 m (3 ft.)
Growth Rate: moderate
Lifespan: 30 to 50 years
Note: can be difficult to establish; forms dense, irregular hedge; aggressive suckering habit; not adapted to wet, poorly drained sites; suitable for saline or nutrient poor soils
Origin: native
Available for all planting types


Photo Credit: TP

Silver buffaloberry is a thorny shrub that suckers freely to form a dense, irregular hedge. Highly adaptable, silver buffaloberry grows best on moist, well-drained sites, but is also drought tolerant and will grow in moderately saline soil. Furthermore, it is tolerant of infertile soils due to its ability to fix atmospheric nitrogen. Best growth occurs in full sun, but it will also grow in part shade. Silver buffaloberry gets its name from its small silver-grey leaves. Branches and branch ends are armed with sharp, spike-like thorns. Separate male and female plants bear inconspicuous flowers, followed by red, sour fruit (female plants only) ripening in August and persisting until winter.

In farmyard shelterbelts, plant it as the outside row. Mixed with other species, silver buffaloberry supplies food and shelter for a variety of birds and other wildlife. The persistent fruit is particularly valuable as a winter food source. In addition, the flowers are an early source of nectar and pollen for bees and other insects.


Photo Credit: TP


Photo Credit: TP


Photo Credit: TP

Snowberry

Symphoricarpus occidentalis

WESTERN SNOWBERRY, BUCKBRUSH

Height: 1.5 m (5 ft.)
Spread: 2 m (6.5 ft.)
Recommended Spacing: 1 m (3 ft.)
Growth Rate: moderate
Lifespan: 30 to 50 years
Origin: native
Only available for wildlife plantings and riparian buffers


Photo Credit: PF

Snowberry is a small, spreading shrub, often forming extensive stands. Best growth occurs on well-drained, light-textured soils. It is drought tolerant and moderately tolerant of saline soils. Snowberry grows best in full sun but will also survive in light shade. In midsummer, clusters of pink or white, small and insignificant flowers bloom over a relatively long period. Greenish-white, pea sized, berry-like fruit in dense clusters persist into winter.

An important cover and food source for animals and birds makes snowberry ideal for use in wildlife plantings. Snowberry is important upland nesting habitat for waterfowl. Also recommended for riparian buffers, its extensive deep roots and rhizomes help control erosion and protect water quality. Flowers are late spring and early summer pollen and nectar source for bees and other insects.


Photo Credit: GI


Photo Credit: TP


Photo Credit: TP

Wildlife Riparian

Villosa Lilac

Syringa villosa

LATE LILAC

Height: 4 m (13 ft.)
Spread: 2.5 m (8 ft.)
Recommended Spacing: 1 m (3 ft.)
Growth Rate: moderate
Lifespan: 30 to 50 years
Note: will not tolerate poorly drained areas
Origin: introduced from China
Not available for riparian buffers

Photo Credit: TP

Villosa lilac is a non-suckering medium shrub. Best growth occurs on moist, medium-textured soils; however, it will not survive flooding. Full sun is required for good growth. Large terminal cluster of rosy-lilac to white flowers appear in mid to late June.

It is recommended as an outside row in farmyard and livestock shelterbelts or as a single row in roadside plantings to reduce erosion and trap snow. Villosa lilac can also be planted as a single or multiple row field shelterbelt. In wildlife plantings, it provides cover for many birds and animals; deer will occasionally browse villosa lilac in the winter. In addition, the flowers are a late spring source of pollen and nectar for bees and other insects.

Photo Credit: PF

Photo Credit: TP

Photo Credit: TP

Farmyard Field Roadside Livestock Wildlife

Bur Oak

Quercus macrocarpa

OAK

Height: 20 m (65 ft.)
Spread: 6 m (20 ft.)
Recommended Spacing: 2.5 m (8 ft.)
Growth Rate: slow to moderate
Lifespan: 50 years+
Note: on dry sites may be reduced to a small tree
Origin: native to Manitoba and eastern Saskatchewan
Available for all planting types

Photo Credit: TP

Bur oak is a medium-sized tree that grows best on deep, moist, medium-textured soils. Full sun is best, but light shade is tolerated. When planted on dry sites, bur oak may become stunted or even reduced to the extent of becoming a shrub. Small to medium edible acorns are ripe in early fall. A strong taproot can access groundwater making it drought tolerant once established.

Recommended to be mixed with other species and/or planted as a middle or inside row in field, farmyard and livestock shelterbelts, bur oak increases height and adds longevity to shelterbelts. In wildlife plantings, many birds roost and nest in bur oak; mule and whitetail deer browse the twigs and foliage; and the acorns are consumed by a wide variety of animals: woodpeckers, flickers, jays, wood ducks, grouse, squirrels, raccoons, chipmunks, and deer.

Photo Credit: TP

Photo Credit: TP

Photo Credit: TP

Cottonwood

Populus deltoides var. *occidentalis*

PLAINS COTTONWOOD

Height: 20 m (65 ft.)
Spread: 15 m (50 ft.)
Recommended Spacing: 2.5 m (8 ft.)
Growth Rate: fast
Lifespan: 50 years+
Note: large branches can break off easily during wind and ice storms - do not plant near buildings or other physical assets
Origin: native
Only available for wildlife plantings and riparian buffers


Photo Credit: PF

Cottonwood is a fast growing and very large poplar. Female trees produce cotton-like bundles of wind-dispersed seeds. It tolerates a wide range of soils and, while it can survive some drought, it grows best under moist conditions. Full sun is ideal, but it will tolerate some shade during establishment since it quickly outgrows most competition.

It is recommended for use in riparian buffers due to its adaptation to floodplains and because its root system can stabilize streambanks and prevent erosion. Cottonwood is used by a variety of wildlife for food (browse), shelter (nesting, cavity dwelling birds), perches (raptors) and building material (beaver dams).


Photo Credit: PF


Photo Credit: GI


Photo Credit: PF

Wildlife Riparian

Green Ash

Fraxinus pennsylvanica

‘PLAINS’ GREEN ASH

Height: 15 m (50 ft.)
Spread: 6m (20 ft.)
Recommended Spacing: 2.5 m (8 ft.)
Growth Rate: moderate
Lifespan: 50 years+
Note: susceptible to 2,4-D drift
Origin: native
Available for all planting types

Photo Credit: TP

Green ash is a medium sized tree that grows best on deep, moist, medium to fine-textured soils; on light-textured soils or dry sites, expect reduced growth. The seed strain ‘Plains’, developed through the AAFC-PFRA Agroforestry Division’s Tree Improvement Program, is tolerant of occasional, short-lived flooding. It requires full sun and is not shade tolerant.

Recommended for use as a middle row of farmyard shelterbelts. It is often planted as a single row for field shelterbelts where even snow distribution is desired. Green ash can also be added to shrub dominated field shelterbelts (e.g. caragana, red-osier dogwood or villosa lilac) to increase their height. In wildlife habitat plantings, birds and other animals use it for cover; the twigs are favoured by wildlife for browsing; and the seeds are eaten by many birds and mammals.

Photo Credit: TP

Photo Credit: ES

Photo Credit: TP

Hybrid Poplar

Populus x hybrid

POPLAR

Height: 25 m (80 ft.)
Spread: 3 m (10 ft.)
Recommended Spacing: 2.5 m (8 ft.)
Growth Rate: very fast
Lifespan: 30 to 50 years
Origin: hybrid of native and introduced poplars
Available for all planting types

Photo Credit: TP

Hybrid poplar is a very fast growing tree on a variety of soil types. Hybrids are selected for their superior adaptive traits for cold and drought tolerance; disease and pest resistance; growth rate and form. Trees on dry sites will be smaller and slower growing than those on moist sites. Trees are either male or female; only the female clones produce the fluffy or cottony seeds.

Once supplied as individual clones or cultivars, the Prairie Shelterbelt Program now distributes unmarked mixed bundles of poplar hybrids. The mixture introduces genetic diversity into poplar plantings. Pest infestations or extreme climate events are less likely to wipe out or seriously damage a row of mixed hybrid poplars, as could happen when only a single clone is used.

In farmyard shelterbelts, hybrid poplar reduces wind erosion and traps snow; reduces environmental stress in livestock; and increases the availability of habitat and food (buds and stems) for birds and other animals. Their roots absorb nutrients, helping to filter water before it enters streams, wetlands and ground water sources. Hybrid poplar also intercepts odour carrying particulates during the growing season, important around intensive livestock operations. Its rapid growth makes it an attractive wood source for bio-energy and for fibre based products such as lumber, veneer, pulp and oriented strand board.

Photo Credit: TP

Photo Credit: TP

Photo Credit: TP

Farmyard Field Roadside Livestock Wildlife Riparian

Manitoba Maple

Acer negundo

BOXELDER

Height: 14 m (45 ft.)
Spread: 6 m (20 ft.)
Recommended Spacing: 2.5 m (8 ft.)
Growth Rate: moderate
Lifespan: 50 years+
Note: susceptible to 2,4-D drift
Origin: native
Available for all planting types

Photo Credit: PF

Manitoba maple has an irregular form with a divided trunk resulting in a few long, spreading and crooked limbs with irregular branching that develop into a broad uneven crown. The species is dioecious with separate male and female trees. Seed production from female trees can be extensive. Best growth occurs on deep, moist soils and it can withstand flooding. It will also tolerate drought but with a reduced growth rate.

Planted as a middle row in farmyard and livestock shelterbelts, Manitoba maple increases height and enhances wind protection of shelterbelts. The species is well adapted to riparian areas. In wildlife plantings, the seeds are a favoured winter food for several bird species and the tree is used for nesting and shelter. Flowers are an early spring source of pollen and nectar for bees and other insects. Manitoba maple can be a good source of syrup when tapped in early spring.

Photo Credit: TP

Photo Credit: ES

Photo Credit: TP

Farmyard | Field | Roadside | Livestock | Wildlife | Riparian

Pincherry

Prunus pensylvanica

BIRD CHERRY

Height: 7.5 to 12 m (25 to 40 ft.)
Spread: 5.5 to 7.6 m (18 to 25 ft.)
Recommended Spacing: 1 m (3 ft.)
Growth Rate: fast
Lifespan: 30 to 40 years
Note: intolerant of shade; susceptible to black knot disease; suckers profusely
Origin: native
Only available for wildlife plantings and riparian buffers

Photo Credit: PF

Pincherry has fairly straight, thin, trunks that form a narrow round-topped crown. The branches, at first ascending, become more or less horizontal and spreading as the tree ages. It grows well in moist, medium to heavy textured soils and has marginal drought tolerance. Pincherry establishes quickly and has rapid growth providing cover and shelter within a few years of planting. Best growth occurs in full sun, and it is intolerant of shade. Long, white flower clusters appear in May; bright red edible berries ripen in late July to August.

Many birds, foxes, skunks, squirrels, deer, raccoons and other animals eat the bright red berries making this tree an excellent choice for wildlife plantings. It also functions well as a riparian buffer because its shallow root system prevents soil erosion, captures nutrients and stabilizes streambanks. Flowers are a source of pollen and nectar for bees and other insects.

Photo Credit: TP

Photo Credit: TP

Photo Credit: TP

Siberian Crabapple

Malus baccata

CRABAPPLE

Height: 6 m (20 ft.)
Spread: 4.5 to 7.5 m (20 to 25 ft.)
Recommended Spacing: 2 m (6.5 ft.)
Growth Rate: moderate
Lifespan: 30 to 40 years
Note: susceptible to fireblight
Origin: introduced from Siberia
Not available for riparian buffers

Photo Credit: PF

Siberian crabapple is adapted to a wide range of soil types. However, it is susceptible to iron chlorosis on high pH, heavy textured (clay) soils. It grows best in full sun, but will tolerate some shade. White to light pink flowers appear in June, followed by very small (the size of large peas) persistent crabapples.

In farmyard shelterbelts, plant to the outside or as a middle row. In wildlife plantings, Siberian crabapple provides high quality cover, roosting, loafing and nesting sites for birds, in addition to excellent browse for rabbits, whitetail and mule deer. Fruit persists well into winter providing food for birds and squirrels. Flowers are a source pollen and nectar for bees and other insects.

Photo Credit: PF

Photo Credit: PF

Photo Credit: PF

Trembling Aspen

Populus tremuloides

ASPEN POPLAR, QUAKING ASPEN, WHITE POPLAR

Height: 15 m (50 ft.)
Spread: 6 to 9 m (20 to 30 ft.)
Recommended Spacing: 2 m (6.5 ft.)
Growth Rate: moderate
Lifespan: 30 to 50 years
Note: shade intolerant
Origin: native
Only available for livestock shelterbelts, wildlife plantings and riparian buffers

Photo Credit: PF

Trembling aspen is a slender tree with a long cylindrical trunk with little taper and a short rounded crown. Grows best on well-drained, moist, sandy or gravelly loams. It is intolerant of shade.

Aspen planted in livestock shelterbelts reduces wind and provides thermal protection to reduce animal stress. The root system is shallow, wide-spreading and commonly produces root suckers making it useful in riparian buffers to stabilize steambanks, reduce erosion and protect water quality. It is also a good choice for wildlife plantings as domestic and wild animals browse the small branches and young suckers.

Photo Credit: PF

Photo Credit: ES

Photo Credit: ES

Livestock Wildlife Riparian

Acute Willow

Salix acutifolia

LONG-LEAVED VIOLET WILLOW

Height: 15 m (50 ft.)
Spread: 15 m (50 ft.)
Recommended Spacing: 2.5m (8ft.)
Growth Rate: fast
Lifespan: 40 to 50 years
Note: performs poorly in dry locations and alkaline soils; susceptible to iron chlorosis on poorly drained, heavy textured soils
Origin: introduced from Eurasia
Available for all planting types

Photo Credit: PF

Acute willow is a medium-sized multi-stemmed tree that performs best on moist, well-drained sites but will withstand short term spring flooding. Good growth occurs in full sun but will grow under as much as 50% shade.

Recommended to be planted as a middle row in farmyard and livestock shelterbelts for wind control and shelter. It can also be planted in areas with adequate rainfall as a single row or in multiple row field shelterbelts. Planted for wildlife, acute willow provides cover and browse for a variety of wildlife species.

Photo Credit: PF

Photo Credit: PF

Photo Credit: TP

Peachleaf Willow

Salix amygdaloides

PEACH WILLOW

Height: 10 m (35 ft.)
Spread: 5 m (17 ft.)
Recommended Spacing: 2.5m (8 ft.)
Growth Rate: fast
Lifespan: 30 to 50 years
Origin: native
Only available for wildlife plantings and riparian buffers

Photo Credit: PF

Peachleaf willow is the largest of the native prairie willows. In Manitoba and Ontario, it can reach up to 12 m (40 ft.), but elsewhere across Canada it is a tall shrub. Typically multi-stemmed, peachleaf willow grows best in moist well-drained soil. Best growth occurs in full sun, but it will grow in up to 50% shade.

It is a good choice for wildlife plantings: rabbits, deer, moose and elk browse on twigs, foliage and bark; several species of birds eat willow buds and young twigs; and beavers use willow branches as a source of food and dam construction materials. In riparian areas, the dense matrix of roots is an effective bio-filter, help stabilize streambanks, reduce erosion and protect water quality.

Photo Credit: BL

Photo Credit: BL

Photo Credit: PF

Silverleaf Willow

Salix alba var. *sericea*

WHITE WILLOW

Height: 15 m (50 ft.)
Spread: 15 m (50 ft.)
Recommended Spacing: 2.5m (8 ft.)
Growth Rate: fast
Lifespan: 40 to 50 years
Origin: introduced from Eurasia
Available for all planting types

Photo Credit: PF

Silverleaf willow is a medium-sized tree that grows best on moist, well-drained sites but will withstand short term flooding during spring. On high pH and poorly drained soil, it is susceptible to iron chlorosis.

Planted as a middle row in farmyard or livestock shelterbelts, silverleaf willow provides wind protection and shelter. In areas with adequate rainfall, it can be planted as a single row or in multiple row field shelterbelts. In wildlife plantings, silverleaf willow provides cover and browse for a variety of wildlife species. It is a source of pollen for bees and other insects.

Photo Credit: JL

Photo Credit: PF

Photo Credit: TP

Siberian Larch

Larix sibirica

‘LINDQUIST’ SIBERIAN LARCH

Height: 18 m (60 ft.)
Spread: 4.5 m (15 ft.)
Recommended Spacing: 2.5m (8 ft.)
Growth Rate: moderate
Lifespan: 50 years+
Note: can be difficult to establish on excessively dry sites; susceptible to larch sawfly and larch spider mite
Origin: introduced from Siberia
Available for all planting types


Photo Credit: TP

Siberian larch is a tall slender tree with a straight, tapering trunk and narrow open crown. The seed strain ‘Lindquist’, developed through the AAFC-PFRA Agroforestry Division’s Tree Improvement Program, grows well in a wide range of soil types but prefers well drained, loamy soils. On sites with high water tables, growth of Siberian larch can approach 50 to 75 cm (20 to 30 in.) annually. Larch is tap-rooted and somewhat drought tolerant once established. Its growth will be reduced in dry, light-textured soils; nor does it grow well under shade, preferring full sun. The short, soft needles occur in bundles of 20 to 50. Larch differs from other conifers by shedding its needles: in late fall, its needles turn yellow and are shed before winter sets in.

Siberian larch is recommended to be planted as a middle or inside row of a farmyard or livestock shelterbelt to increase height and provide wind protection. In areas with good soil moisture, it can be planted in single or multiple row field shelterbelts. Siberian larch is also a good choice for wildlife plantings: seeds are eaten by birds and small mammals, and deer browse new growth. Harvested logs make ideal posts due to its decay-resistant nature.


Photo Credit: TP


Photo Credit: ES


Photo Credit: PF

Farmyard Field Roadside Livestock Wildlife Riparian

Scots Pine

Pinus sylvestris

‘PRAIRIE GREEN’ SCOTS PINE, SCOTCH PINE

Height: 18 m (60 ft.)
Spread: 5 m (16 ft.)
Recommended Spacing: Farmyard - 3.5m (12 ft.)
Growth Rate: moderate
Lifespan: 50 years+
Note: will not tolerate flooding; young trees browsed by deer
Origin: introduced from Europe and Asia
Available for all planting types


Photo Credit: TP

Scots pine is a tall tree that grows on well-drained, moist sites; best growth occurs on light to medium textured soils in full sun. The seed strain, ‘Prairie Green’, developed through the AAFC-PFRA Agroforesty Division’s Tree Improvement Program, is moderately resistant to winter browning, and has superior needle retention (three years or more). Scots pine is moderately drought tolerant once established. The needles are slightly twisted and occur in pairs. The rock-hard pine cones point backwards, are roundish when mature, and are retained for two years before falling. Expect faster growth compared to spruce.

Plant this species as an inside row of farmyard or livestock shelterbelts, or as a single row or in multiple row field shelterbelts to provide year-round wind protection, erosion control and thermal cover. If planted as a field belt, Scots pine can be planted as close together as 2 m (6.5 ft.). In wildlife plantings, Scots pine provides thermal cover to many animals in winter and perching sites for birds throughout the year. The branches of younger trees may be browsed by deer, while porcupines eat the bark and may girdle and kill young trees.


Photo Credit: TP


Photo Credit: TP


Photo Credit: TP

Colorado Spruce

Picea pungens

BLUE SPRUCE

Height: 18 m (60 ft.)
Spread: 6 m (20 ft.)
Recommended Spacing: 3.5 m (12 ft.)
Growth Rate: slow to moderate
Lifespan: 50 years+
Note: does not perform well on unprotected sites; does not tolerate flooding
Origin: introduced from the USA Rocky Mountains
Available for all planting types


Photo Credit: TP

Colorado spruce grows best on well-drained clay or clay-loam soils, but will tolerate sandy soils if adequate moisture is available. It is more drought tolerant than white spruce and does not tolerate flooding. Best growth occurs in full sun, but Colorado spruce will survive in part shade, albeit with slower growth. Also, protection is required during establishment. Needles are relatively short and sharp, and like all spruce, occur singly. Needle colour is variable among trees and ranges from dull green, blue-green to silver-blue, resulting in trees that appear either green or some shade of blue-green, the latter resulting in their common name of 'blue spruce'. Seedlings distributed through the Prairie Shelterbelt Program are variable in colour.

Recommended for use as an inside row of a farmyard or livestock shelterbelt to provide year-long wind control; snow distribution and trapping; and thermal cover. It is rarely planted as a single row field shelterbelt because of the difficulty in establishing it in the open. It is better adapted for use in multiple row field shelterbelts. Wildlife use spruce to provide thermal cover in winter, and nesting and roosting cover for small birds during summer. Branches are rarely browsed but the seeds may be eaten by small mammals and birds.


Photo Credit: TP


Photo Credit: PF


Photo Credit: TP

Farmyard Field Roadside Livestock Wildlife Riparian

White Spruce

Picea glauca

CAT SPRUCE

Height: 18 m (60 ft.)
Spread: 6 m (20 ft.)
Recommended Spacing: 3.5 m (12 ft.)
Growth Rate: slow
Lifespan: 50 years+
Origin: native
Available for all planting types

Photo Credit: PF

White spruce has a uniform conical crown with branches that spread or droop slightly and extend to the ground, concealing a trunk with a pronounced taper and thin scaly bark. It grows best on well drained, moist, loam soils. Some flooding is tolerated but it will not survive long in standing water. Growth is poor on dry or exposed sites and seedlings require protection during establishment. The needles are green, short, occur singly, and are not as sharp as those of the Colorado spruce. Quite tolerant of shade, the tree retains its needles and branches low on the trunk; in dense plantings with little light, the lower branches eventually self-prune. Under these conditions, the tree develops a long, slightly tapering trunk, almost free of branches.

Recommended to be planted as an inside row of a farmyard or livestock shelterbelt to provide thermal cover, year-long wind control and trap snow. It is rarely planted as a single row field shelterbelt because it requires protection during establishment; it is better adapted for use in multiple row field shelterbelts. In wildlife plantings, it provides cover and thermal protection for wildlife; seeds are eaten by birds, insects and small mammals; and deer may browse the lower branches.

Photo Credit: PF

Photo Credit: PF

Photo Credit: PF

Farmyard Field Roadside Livestock Wildlife Riparian

Agroforestry – an intensive land management system that optimizes the benefits from the biological interactions created when trees and/or shrubs are deliberately combined with crops, forage and/or livestock.

Conifer – a tree or shrub that bears cones; coniferous tree. Most conifers are evergreen. Spruce and pine are evergreen but larch is not; it is in fact deciduous.

Deciduous – a tree or shrub that drops its leaves or needles in the fall and produces new ones the following spring.

Evergreen – as not all evergreens are conifers, not all conifers are evergreens – see Conifer, above.

Planting types

Farmyard Shelterbelt – for protection of a yard, residence or other buildings.

Field Shelterbelt – for soil erosion control of cultivated fields and for protection of crops.

Roadside Shelterbelt – for snow control along roads or lanes; also for privacy and dust and noise reduction.

Livestock Shelterbelt– for protection of livestock and livestock facilities; also odour control.

Wildlife Planting – for improvement of wildlife habitat, including enhancement of field shelterbelts.

Riparian Buffer – to buffer between agricultural land and bodies of water, including floodplains and wetlands. Also to control soil erosion and stabilize streambanks.

Shrub – a woody plant that is few to multi-branched arising from the base, usually under 8 m (26 ft.) tall at maturity. The function of shrubs in shelterbelts is to reduce low level winds, control erosion and trap snow. Many shrubs also provide important cover and food for wildlife. Planted in riparian zones, some species are particularly effective at stabilizing streambanks, trapping soil and sediments, and protecting water quality.

Tree – a woody plant with a single trunk or few trunks and typically over 8 m (26 ft.) tall at maturity. Trees add height to shelterbelts to control wind speeds over a greater distance (distance of control = 10 x height of shelterbelt), protecting buildings, crops and livestock. Wildlife may use trees variously depending on the species: residence, food, and/or thermal cover. Tree species adapted to high moisture conditions can be planted in riparian zones to control erosion, stabilize streambanks, capture/absorb nutrients, and protect water quality.

Shrubs, Deciduous and Coniferous Trees Recommended for Agroforestry Plantings

Species	Mature Height m (ft.)	Life Span[1]	Moisture Requirements[2]	Growth Rate[3]	Salt Tolerance[4]	Potential Spread by Seed or Suckers[5]	Planting Distance m (ft.)[6]	# Trees per 1 km (per 1 mile)
Shrubs								
Caragana	5 (16)	L	L	M	M	H	0.3 (1)	3333 (5280)
Choke Cherry	7 (23)	M	M	M	L - M	M	1 (3)	1000 (1760)
Hawthorn	4 (13)	M	L	M	L	M	1 (3)	1000 (1760)
Hedge Rose	2 (6.5)	M	L - M	F	L - M	M - H	1 (3)	1000 (1760)
Red Elder	3 (10)	M	H	F	L	M	1 (3)	1000 (1760)
Red-osier Dogwood	2.5 (8)	M	M - H	M	L - M	M	1 (3)	1000 (1760)
Sea Buckthorn	5 (16)	M	L	M	H	H	1 (3)	1000 (1760)
Silver Buffaloberry	4.5 (15)	M	L	M	H	H	1 (3)	1000 (1760)
Snowberry	1.5 (5)	M	L	M	M	H	1 (3)	1000 (1760)
Villosa Lilac	4 (13)	L	M	M	M	M	1 (3)	1000 (1760)
Deciduous Trees								
Bur Oak	20 (65)	L	L	S - M	L	L	2.5 (8)	400 (660)
Cottonwood	20 (65)	L	H	F	L	L	2.5 (8)	400 (660)
Green Ash	15 (50)	L	M	M	M	L	2.5 (8)	400 (660)
Hybrid Poplar	25 (80)	M	H	VF	L	L	2.5 (8)	400 (660)
Manitoba Maple	14 (45)	M	M	M	M	M	2.5 (8)	400 (660)
Pincherry	7.5 (25)	M	M	F	L	M	1 (3)	1000 (1760)
Siberian Crabapple	6 (20)	M	M	M	L - M	L	2 (6.5)	500 (812)
Trembling Aspen	15 (50)	M	M - H	M	L	H	2 (6.5)	500 (812)
Willow, Acute	15 (50)	M	H	F	L	L	2.5 (8)	400 (660)
Willow, Peachleaf	10 (35)	M	L - M	F	L	L	2.5 (8)	400 (660)
Willow, Silverleaf	15 (50)	M	H	F	L	L	2.5 (8)	400 (660)
Coniferous Trees								
Scots Pine	18 (60)	L	M	M	L	L	3.5 (12)	285 (440)
Siberian Larch	18 (60)	L	H	M	L	L	2.5 (8)	400 (660)
Spruce, Colorado	18 (60)	L	M	S - M	L - M	L	3.5 (12)	285 (440)
Spruce, White	18 (60)	L	H	S	L	L	3.5 (12)	285 (440)

1. Life Span: S = Short (30 years), M = Medium (30 to 50 years), L = Long (>50 years)
2. Moisture Needs: L = Low (<300 mm/year), M = Medium (300 to 400 mm/year), H = High (>400 mm/year)
3. Growth Rate: S = Slow (<0.25 m/year), M = Moderate (0.25 to 0.5 m/year), F = Fast (0.5 to 1.0 m/year), VF = Very Fast (>1.0 m/year)
4. Salt Tolerance: L = Low, M = Medium, H = High
5. Potential Spread by Seed or Suckers: L = Low, M = Medium, H = High
6. Recommended minimum planting distance for farmyard shelterbelts

Sketch Pad

An agroforestry planting is a long-term investment, and careful planning can improve benefits and help avoid future problems. A sketch of the planting area helps in the planning process.

Identify and locate the following in your sketch:

- Note orientation (north) on the sketch pad
- Prevailing or troublesome winds
- Locate existing buildings or structures and any future developments
- Identify property lines, fences and roads
- Locate existing trees (bluffs or planted rows)
- Identify power lines/utility service lines (include buried lines)
- Identify trouble areas where there is snow buildup, flooding, soil problems, steep slopes or lagoons
- Note all distances between structures
- Indicate landscape features (hills, water areas, stubble, grass, summerfallow)
- Include location of new tree rows, species selection, row spacing and length of rows