Black Walnut

Black Walnut
(Juglans nigra)

General Description

A large oval to rounded, somewhat open-crowned tree. Considered the most valuable timber tree. The tree is borderline hardy in North Dakota and some seedling sources will be subject to winter dieback. Select hardy North Dakota seed sources. The largest tree in North Dakota is 65 feet tall with a canopy spread of 50 feet.

Leaves and Buds

Bud Arrangement - Alternate.

Bud Color - Buds are pale, silky-downy, ovate, and grayish, superposed.

Bud Size - About 1/3 inch long and slightly longer than wide.

Leaf Type and Shape - Pinnately compound, with 15 to 23 leaflets.

Leaf Margins - Leaflets are ovate-oblong, to ovate-lanceolate, acuminate, rounded at the base, and irregularly serrate.

Leaf Surface - Upper surface at first minutely hairy, finally nearly smooth and somewhat shiny; underside is hairy and glandular.

Leaf Length - 10 to 20 inches; leaflets 2 to 4 inches.

Leaf Width - 2 to 6 inches; leaflets 1/2 to 1½ inches.

Leaf Color - Green leaflets; yellow fall color.

Flowers and Fruits

Flower Type - Catkins, 2 to 7 inches long.

Flower Color - Greenish.

Fruit Type - A globular drupe bearing a nut 1 to 2 inches across, indehiscent, edible.

Fruit Color - Green husk, until ripening in fall, when it turns black.

Form

Growth Habit - Under forest conditions devoid of branches to ½ its height. Open-grown trees are frequently forked and limby.

Texture - Medium, summer; coarse, winter.

Crown Height - 35 to 60 feet.

Crown Width - 30 to 50 feet.

Bark Color - Bark is thick, ridged, very dark brown, with deep diamond-shaped furrows.

Root System - Produces a deep, extensive taproot, which makes transplanting difficult. Roots and decaying plant parts release a toxic compound (juglone) which inhibits the growth of other plants growing near Black Walnut trees.

Environmental Requirements

Soils

Soil Texture - Sensitive to soil conditions. Does best on deep, well-drained, fertile, loamy soils.

Soil pH - 6.0 to 7.5.

Windbreak Suitability Group - 1, 3.

Cold Hardiness

USDA Zone 4.

Water

Prefers moist well-drained soils. Does not withstand extended ponding or drought.

Light

Full sun, tolerates partial shade.

Uses

Conservation/Windbreaks

Medium tree for protected areas of farmstead windbreaks in eastern part of North Dakota.

Wildlife

Used extensively by over 20 species of wildlife for food and cover.

Agroforestry Products

Wood - Heartwood is a rich dark brown and used for veneer and furniture. The wood is heavy, hard, strong, close-grained, durable, and is easily worked. Nut shells are ground for industrial polishing and cleaning. Pulp and roots are used to make a black dye.

Food - Confectionery uses for nuts.

Medicinal - Used as a laxative, an astringent for treatment of skin problems and in cancer research.

Urban/Recreational

Used for parks and other large landscape areas. Less suitable for small yards and boulevards because of its large size and messy fruit.

Cultivated Varieties

Juglans nigra 'Laciniata' - Finely dissected leaflets, but not winter hardy in North Dakota.

Related Species

Butternut (*Juglans cinerea*) - Use North Dakota seed sources.

Manchurian Walnut (*J. mandshurica*) - Hardy in limited plant evaluations in North Dakota.

Pests

No major pest problems. Plant extracts are found to be effective against certain insect pests.

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Plant Fact Sheet

BLACK WALNUT

Juglans nigra L.

Plant Symbol = JUNI

Contributed by: USDA NRCS New York State Office

Robert H. Mohlenbrock
USDA NRCS, 1995
Northeast Wetland Flora
@USDA NRCS PLANTS

Uses

Traditionally the dark colored wood was used for gun stocks, fencing, airplane propellers, and cabinetry. Today the high valued wood is utilized for some of the finest quality furniture. The large nuts produced by this tree are consumed by wildlife and humans.

Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Description

Black walnut usually matures in about 150 years. An average site will produce mature black walnut trees which are 70 to 80 feet in height and attain diameters of 2 to 4 feet when grown in a forest stand. On the best sites this tree may reach up to 150 feet tall and over 8 feet in diameter. When grown at low stocking or in open fields, black walnut produces a short, wide spreading crown.

A deep, wide spreading root system supports this large tree. Mature trees have a deeply furrowed gray-brown to nearly black bark. The brown to orange-brown twigs are stout, with large, shield shaped, conspicuous leaf scars. The deciduous leaves are 1 to 2 feet long, alternate, and compound. The 15 to 23 leaflets are stemless, unequally rounded, and wider at the base than at the pointed tips.

Unisexual flowers emerge on black walnut from mid-April to mid-June, appearing with the leaves on a separate inflorescence of the same tree. A globular fruit is produced which contains a corrugated nut in its yellowish-green husk. The nut is usually 1 1/2 to 2 1/2 inches in diameter, containing an oil-rich, sweet, and edible seed. The large fruit ripens between September and October. Upon ripening the husk softens and turns dark brown to black.

Adaptation and Distribution

Found throughout the eastern U.S., black walnut thrives in deeper, well drained, neutral soils. Black walnut is a shade intolerant species, and must have direct sunlight to grow optimally. It requires about 35 inches of annual precipitation, an annual average temperature of about 55 degrees F., with no less than 170 growing days for optimum growth and development. This species survives beyond its ideal site requirements as it approaches the limits of its native range. Black walnut is found naturally growing from Vermont to Minnesota, south to Florida and Texas.

When acquiring planting stock it is important to utilize local or regional sources, since climatic variation has been noted.

For a current distribution map, please consult the Plant Profile page for this species on the PLANTS Website.

Establishment

Seed dormancy is broken by natural over-winter freezing and thawing conditions or artificially with cool moist stratification.

Natural: Shortly after leaves fall from the tree, the nuts fall. This species is naturally distributed by various wildlife, as they store nuts in the soil for winter. After the freezing and thawing of winter, those nuts not consumed by wildlife will normally germinate the first or second spring. On good sites, seedlings will grow 3 feet the first year and double that the second year.

Nursery: Propagating seedlings under nursery conditions is a viable choice, but precautions must be taken to protect against rodent predation. Direct seeding onto raised beds or at a site will lead to productive results. Seedlings should be distributed as 1/0 bare-root or containerized stock. On fertile nursery soils, black walnut should not require additional nutrients for adequate growth.

Pests and Potential Problems

European canker and walnut caterpillar are the only two pests documented to attack black walnut.

Cultivars, Improved, and Selected Materials (and area of origin)

Over 100 varieties of black walnut have been selected for their nut quality, but most commercially available seedlings are produced from local collections. Specific varieties are typically propagated from grafts.

Prepared By & Species Coordinator:

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Edited: 05Feb2002 JLK; 060801 jsp

For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site<http://plants.usda.gov> or the Plant Materials Program Web site <http://Plant-Materials.nrcs.usda.gov>

Golden Willow

Golden Willow
(Salix alba 'Vitellina')

General Description

A large low-branching tree forming a broad round-topped crown with slender, drooping branches. Brought over from Europe and central Asia. Widely planted as a yard tree. Its branches shed easily throughout the season and make it somewhat of a nuisance tree in yards.

Leaves and Buds

Bud Arrangement - Alternate.

Bud Color - Yellow with a silky down.

Bud Size - 1/5 inch long, rounded at apex, and flattened against the twig with a single, cap-like bud scale.

Leaf Type and Shape - Simple, lanceolate, acuminate-tipped, and

cuneate.

Leaf Margins - Finely-serrate.

Leaf Surface - Smooth above, glaucous and silky beneath.

Leaf Length - 1½ to 4 inches.

Leaf Width - 1/4 to 1/2 inch.

Leaf Color - Bright-green on top, silvery below.

Flowers and Fruits

Flower Type - Catkins 3/4 to 2½ inches long.

Flower Color - Yellowish-green.

Fruit Type - Seed attached to cottony hairs.

Fruit Color - Brownish-white.

Form

Growth Habit - Large, spreading to round crown.

Texture - Fine, summer; medium, winter.

Crown Height - 40 to 55 feet.

Crown Width - 40 to 55 feet.

Bark Color - One year old twigs are yellow, turning light-brown with age. Tannish-brown, ridged and furrowed, corky bark.

Root System - Fibrous spreading.

Environmental Requirements

Soils

Soil Texture - Performs best on deep, moist loams, or along stream beds and wetlands.

Soil pH - Adaptable to high pH soils, 5.5 to 8.0.

Windbreak Suitability Groups - 1,1K,2, 2K, 2H.

Cold Hardiness

USDA Zone 2.

Water

Does well in moist sites and survives severe flooding. Often dies back during periods of extended drought.

Light

Full sun to partial shade.

Uses

Conservation/Windbreaks

Medium to tall tree for farmstead and field windbreaks and riparian plantings.

Wildlife

Dense shrub form provides cover to many wildlife species. Buds and twigs are used by upland game and song birds. Fur-bearing mammals feed on buds, bark and wood. Small mammals feed on foliage and catkins. Hoofed browsers feed on twigs and foliage.

Agroforestry Products

Wood - Fuelwood, pallets, crates, furniture, cooperage, woodenware and carving.

Medicinal - Early Americans and Europeans used an extract for headaches, fever, gout, and pain. Willow is a source of salicin which is broken down to salicylic acid, the main component in aspirin.

Urban/Recreational

Very attractive and functional shade, windbreak and accent tree. Use near water features in landscape. A messy tree if used as a yard specimen, due to twig drop.

Cultivated Varieties

Flame Willow (*Salix alba* 'Flame') - Dense form, reddish twigs.

Redstem Willow (*S. alba* 'Chermesina') - Reddish new twigs, less spreading than the species.

Siberian White Willow (*S. alba* 'Sericea') - Silvery-gray hairy leaves.

Weeping Golden Willow (*S. alba* 'Tristis') - Popular weeping specimen tree in yards, but very messy tree due to twig drop.

Related Species

Peach-leaved Willow (*Salix amygdaloides*)

Laurel Willow (*Salix pentandra*)

Pests

Aphids can be a serious problem on willows.

Golden willow

Salix alba vitellina

Growth Form: globular to spreading
Crown Density: moderate
Size: to 35 feet high
to 35 foot spread
Drought Resistance: poor
Cold Hardiness: excellent
Growth Rate: rapid
Life Span: moderate
Elevational Range: to 8,000 feet
Soil Conditions: tolerates alkaline and salts well
Possible Insect Problems: aphids
Possible Disease Problems: cytospora canker; bacterial wetwood
Wildlife Value: moderate: song and game birds; food value for buds and twigs
Seasonal Color: orange-yellow bark on young growth in winter
Miscellany: requires moist soil

Taken from: Trees for Conservation, a buyer's guide, Colorado State Forest Service

Laurel Willow

Laurel Willow *(Salix pentandra)*

General Description

A small to medium-sized tree that is often seen in a shrubby form. One of the first to leaf out in spring and last to drop its leaves in autumn. Attractive, highly glossy leaves and round crown. The largest tree in North Dakota is 45 feet tall with a canopy spread of 36 feet.

Leaves and Buds

Bud Arrangement - Alternate.

Bud Color - Terminal buds absent, laterals brownish-green.

Bud Size - Buds are 1/5 inch long, rounded at apex, and flattened against the twig.

Leaf Type and Shape - Simple, elliptic-lanceolate to ovate.

Leaf Margins - Short-acuminate, rounded or subcordate at base.

Leaf Surface - Leathery, glabrous and highly glossy.

Leaf Length - 2 to 3½ inches.

Leaf Width - 2/3 to 1 inch.

Leaf Color - Lustrous, dark-green above, lighter below with a yellowish midrib.

Flowers and Fruits

Flower Type - Catkin.

Flower Color - Golden-yellow.

Fruit Type - Capsule, cottony or silky hairy seeds.

Fruit Color - Greenish-yellow to tan.

Form

Growth Habit - Ascending branches, long and flexible limbs, rounded crown.

Texture - Medium-fine, summer; medium, winter.

Crown Height - 25 to 40 feet.

Crown Width - 20 to 35 feet.

Bark Color - Gray-brown and fissured.

Root System - Shallow and wide-spreading.

Environmental Requirements

Soils

Soil Texture - Performs best on moist deep loams along streams or wetlands.

Soil pH - 5.5 to 8.0.

Windbreak Suitability Group - 1, 1K, 2, 2K, 2H.

Cold Hardiness

USDA Zone 3.

Water

Does well on moist sites and survives flooding. May die back during periods of extended drought.

Light

Full sun to partial shade.

Uses

Conservation/Windbreaks

Small to medium height tree for farmstead windbreaks and riparian plantings.

Wildlife

Very good for wildlife. Used as food and cover for a wide variety of wetland wildlife.

Agroforestry Products

Wood - Firewood, furniture, crafts.

Medicinal - Used as an astringent and for fevers, gout, pain and headaches. Contains salicin used in aspirin.

Urban/Recreational

Moist areas in parks and other landscape sites. The glossy foliage and dense round form make this a good ornamental tree where moist sites are available.

Cultivated Varieties

None.

Related Species

Prairie Cascade Willow (Salix x 'Prairie Cascade') - Parentage Laurel Willow x Weeping Golden Willow released from Morden Research Station, Morden, Manitoba. A weeping form.

White Willow (*Salix alba*)

Pests

No serious disease problems, but can be subject to leaf diseases. Aphids can be a problem.

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Plant Guide

PEACHLEAF WILLOW

Salix amygdaloides Anderrs.

Plant Symbol = SAAM2

Contributed by: USDA NRCS National Plant Data Center & Illinois State Office

Robert Mollenbrock
USDA, NRCS, Wetland Science Institute
@ PLANTS

Alternative Names
Wright willow, almond willow, willow

Uses
Willows were used for making dye, furniture, mats, baskets, drums, stirrups, tipi pegs and pins, fox and fish traps, hunting lodge poles, and meat-drying racks (Kindscher 1992). Willows were and still are used for baskets throughout their range. The Paiute, Ute, Shoshone, Hopi, Havasupai, Mandan, Cheyenne, Arapaho, Kiowa, and others use *Salix lucida* for basketweaving (James 1972, Mason 1988).

Kelly Kindscher(1992) wrote in *Medicinal Wild Plants of the Prairie*: "The Blackfeet made a tea from the fresh root of *Salix* species to treat internal hemorrhage, throat constrictions, swollen neck glands, and bloodshot or irritated eyes. The twigs were also gathered and preserved. Steeped in boiling water, they were made into a tea to cure fever or alleviate pain."

Salix species were used as chew sticks to clean teeth by many other Indian tribes, including the Choctaw, Delaware, and Cheyenne. The peachleaf willow was favored by the Osage, Delaware, and Cherokee for this purpose (Elvin-Lewis 1979). The Kiowa made a tea of willow leaves, which they rubbed on the body to cure pneumonia and relieve rheumatic aches. They also chewed the bark to relieve toothaches (Vestal and Shultes 1939). The Comanche burned the stems of the willow and used the ashes to treat sore eyes (Carlson and Jones 1939). To restore themselves both physically and mentally, the Dakota drank a willow-bark tea (Andros 1883). The Ojibwe used peachleaf willow bark externally to treat skin rashes.

Aspirin is the pharmaceutical equivalent of willow bark tea, which is an effective remedy for headache, fever or sore throat. More than 2,400 years ago, the Greeks learned to use extracts of several native willow species to treat pain, gout, and other illnesses. In more recent times, in 1839, salicylic acid was isolated from wild plants and manufactured synthetically. Early salicylic acid-based products had unpleasant side effects. Sixty years later, the Bayer Company developed a derivative of salicylic acid, called it aspirin, and the rest is history.

Tea made from willow leaves will cure laryngitis. Willow reduces inflammation of joints and membranes (Moore 1979). When used as an analgesic, willow treats urethra and bladder irritation, infected wounds, and eczema. Willow is used as an over-all treatment of many diseases, including hay fever, diarrhea, prostatitis, satyriasis, and as a relief of ovarian pain. A poultice is made for treating gangrene and skin ulcers.

Young willow shoots can be stripped of their bark and eaten. The young leaves may be eaten in case of emergency. The inner bark can be eaten raw, prepared like spaghetti, or made into flour.

Riparian: Peachleaf willow is an overstory dominant species in many riparian ecosystems throughout the American west and midwest. Riparian ecosystem functions provided by willows include the following: 1) Riparian vegetation traps sediments and nutrients from surface runoff and prevents them from entering the aquatic system; 2) the dense matrix of roots in the riparian zone can serve as an effective filter of shallow groundwater; 3) water quality is improved through filtration and the trapping of sediment, nutrients (particularly nitrogen dissolved in groundwater), and pollutants; and 4) riparian areas act as a sponge by absorbing floodwaters. The water

is then slowly released over a period of time, which minimizes flood damage and sustains higher base flows during late summer.

Wildlife: Structurally complex riparian vegetation communities provide many different habitats and support a diverse array of animal species. The multiple layers of vegetation provide multiple niches for many species of insects and wildlife canopies of plants growing on streambank provide shade, cooling stream water, while roots stabilize and create overhanging banks, providing habitat for fish and other aquatic organisms.

Rabbits and many ungulates (including deer, moose, and elk) browse on willow twigs, foliage, and bark (Martin 1951). Beaver love willow branches. Several species of birds eat willow buds and young twigs. Riparian forests support a high diversity of breeding birds (Miller 1951). The percentage of breeding individuals, which are migratory, is very high in the cottonwood-willow habitat. Moister conditions in the cottonwood-willow forest may promote lusher plant growth, higher invertebrate populations and, therefore, more available food for flycatchers, warblers, and other migratory, insectivorous birds. Riparian areas support up to 10.6 times the density of migrant birds per hectare as adjacent non-riparian areas (Stevens et al. 1977). Most of these migratory birds belong to the foliage insect (47%) or air insect (34%) foraging guilds.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status, and wetland indicator values.

Description
Willow Family (Salicaceae). Peachleaf willow (*Salix amygdaloides*) is a small to medium sized tree with one to several trunks up to 12 m tall (40 feet) (M^{c}Gregor et al. 1986, Stephens 1973). The twigs are gray to light yellow, shiny, and flexible. The leaves look like peach leaves; they are yellowish green above, pale to white-glaucous beneath, glabrous, lance-shaped, 3-8 cm (1.2-3") long and finely serrate. The petioles are glandless. Catkins emerge with the leaves; pistillate (female) catkins are 3-8 cm long, on leaf branchlets 1-4 cm long. Bracts are deciduous, pale yellow, and villous on the inside. The fruits are ovoid capsules 3-5 mm long, glabrous, uncrowded on the axis giving the catkin a loose, open appearance. When ripe, the capsules open to release tiny wind-born seeds with silky hairs at their base. Peachleaf willow flowers in May and fruits in June.

Distribution
Peachleaf willow grows in riparian areas such as the banks of streams and ponds, low woods, roadside gullies, and prairie sloughs. It ranges from Quebec, west across southern Canada to British Columbia, south to Oregon, Utah, and Arizona, east to Texas, and northeast to Kentucky and Vermont. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Establishment
Willows root freely from cuttings, and are easy to propagate. Willows are difficult to propagate in quantity by seed.

The NRCS, Plant Materials Center, Los Lunas, New Mexico, in cooperation with the U.S. Fish and Wildlife Service, developed a pole planting technique for establishing willow (Hoag 1993a). We reprint this procedure below. "Trial planting on well adapted sites indicate more that 80% survival of cottonwood and willow poles when dormant poles are cut and planted between November and February. It is essential to monitor the water tables at proposed planting sites for at least one year before planting. Poles planted where the water table fluctuates widely will have lower survival rates than those planted where water table is relatively stable. If groundwater monitoring shows the water level will drop more than 3 feet during the growing season (May-October), another site should be selected. Monitoring of observation wells for at least one calendar year before planting will allow better planting depth to ensure establishment."

Steps for Successful Pole Plantings

- Select collection sites as close to the area as possible to conserve genetic diversity. Try to match donor site and revegetation site in terms of soils, elevation, hydro-dynamics, permanent groundwater table, and soil salinity (which should be low).
- Select willow cuttings from a local, native stand in healthy condition. Prune no more than 2/3 of plants in an area. Willow cuttings for pole plantings should generally be at least 1/2 inch in diameter or larger. Select the longest, straightest poles available. Use only two to four-year old wood. The total length of the poles needed depends upon the water table depth.
- Measure water table fluctuations in the planting area for at least 1 year, preferably longer, to determine the lowest water table depth. Take a reading at least once a month, preferably more often during the driest months of the year. Cut

poles while dormant. Remove all side branches except the top two or three.

- Prepare cuttings by trimming off the top to remove the terminal bud, allowing a majority of the energy in the stem to be sent to the lateral buds for root and shot development.
- Soak poles in water for at least 5 to 7 days before planting.
- Dig holes to the depth of the lowest anticipated water table. Sites where the water table will be within one foot of the ground surface during the growing season are better suited for willows than cottonwoods.
- The cuttings should extend several inches into the permanent water table to ensure adequate moisture for sprouting. At least 1/2 to 2/3's of the cutting should be below ground to prevent the cutting from being ripped out during high flows. Usually, at least 2 to 3 feet should be below ground. It should also be long enough to emerge above adjacent vegetation such that it will not be shaded out.
- Place the cuttings in the holes the same day they were removed from the soak treatment. Set the butt as close to the lowest annual water table elevation as possible.
- Electric hammer drills (Dewalt model DW530) fitted with one-inch diameter, 3-foot bits were used to plant thousands of willows in New Mexico. With one drill, two people installed 500 willow cuttings per day to a 3-foot depth. A power auger or a punch bar can also be used.
- Willow pole cuttings were generally planted on 10 to 20 foot centers in New Mexico. Areas with a shallow water table (4-6 feet) were generally planted with a higher number of pole cuttings to enhance overall survival. Often understory species were planted under the canopy of pre-existing overstory (cottonwoods, tree willows), since they are often observed occupying this niche.
- It is critical to ensure that the soil is packed around the cutting to prevent air pockets. "Mudding" (filling the hole with water and then adding soil to make mud slurry) can remove air pockets.
- When necessary, install tree guards around the poles to protect from beavers, other rodents, or rabbits. Willows tend to be fairly resistant to pruning from beavers, so tree guards may not be necessary.
- As buds begin to swell (usually in April or May), remove them from the lower two-thirds of the pole. This will reduce evapo-transpiration water loss and stimulate root growth.
- Exclude the planting area from livestock grazing for at least two to three growing seasons.

Seed Collections

- Willow seeds must be collected as soon as the capsules mature (when they turn from green to yellow or tan).
- Plant seeds immediately, since they retain their viability for only a few days at room temperature. Even under the most favorable conditions, maximum storage is four to six weeks.
- Germination takes place 12 to 14 hours after planting. Keep soil moist while seedlings germinate and grow.
- When seeding outdoors, willows require moist soil from spring over-bank flows, capillary wetting of the soil surface, or irrigation for establishment.

Management

Traditional resource management of willow includes the following:

- Willows were traditionally tended by pruning or burning to produce long straight stems.
- Willow is gathered only at certain times of the year, beginning in the autumn after the leaves fall. For many weavers, gathering will continue until the following spring when the sap begins to rise again.
- Often, basketweavers will prune many willows, sometimes replanting the stems, so there will be nice straight basketry materials the following year.
- Before gathering, the weavers make offerings of thanks and pray for permission to gather. Often tobacco or other offerings are given before beginning to gather.
- Basket weavers process materials with their hands and mouths. Herbicides sprayed on willows and along streams have a much higher health risk for humans when they are processed and used for traditional materials.

Howe and Knopf (1991) conclude that to ensure the survival of willows and cottonwoods in riparian communities, resource managers need to implement strategies to control the spread of exotic species.

Livestock grazing has widely been identified as a leading factor causing or contributing to degradation of riparian habitats in the western United States (Chaney et al. 1990, Fleischner 1994, Ohmart 1996). Livestock grazing can alter vegetative structure and composition of riparian habitat. Overgrazing,

especially by livestock and big game, frequently changes plant species composition and growth form, density of stands, vigor, seed production of plants, and insect production. Livestock grazing can cause the replacement of bird and mammal species requiring the vertical vegetation structure of riparian habitat to species, which are ubiquitous in their habitat preferences. Previous heavy cattle grazing changed the bird and small mammal community composition in riparian areas through reduction of shrub and herbaceous cover.

Slovlin (1984) recommended a 5-year rest from cattle grazing to re-establish healthy stands of riparian vegetation such as cottonwood and willows. Siekert et al. (1985) reported that spring grazing showed no significant changes in channel morphology, whereas summer and fall grazing did. However, even with limited seasonal grazing, all tree seedlings would be eliminated. Marlow and Pogacnik (1985) recommended fencing riparian habitat, rest-rotation, light grazing (<20% forage removal), and grazing after streambanks have dried to 10% moisture.

Cultivars, Improved and Selected Materials (and area of origin)

Containerized peachleaf willow saplings are available from most nurseries in the areas where they grow. We recommend using plants from the same region, elevation, climate, soil type, moisture, or hydrologic regime as you are replanting.

Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under "United States Government." The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture."

References

Andros, F. 1883. *The medicine and surgery of the Winnebago and Dakota Indians*. American Medical Association Journal 1: 116-118.

Baird, K. 1989. *High quality restoration of riparian ecosystems*. Restoration and Management Notes 7(2):60-64.

Bentrup, G. & J. C. Hoag 1998. *The practical streambank bioengineering guide. User's guide for natural streambank stabilization techniques in the arid and semi-arid Great Basin and Intermountain West*. USDA, NRCS, Plant Materials Center, Aberdeen, Idaho.

Carlson, G.G. & V.H. Jones 1939. *Some notes on use of plants by the Comanche Indians*. Michigan Academy of Science, Arts, and Letters 25: 517-543.

Ellis, L.M. 1994. *Bird use of salt cedar and cottonwoods on a grazed and ungrazed plains bottomland in Northeastern Colorado.* USDA, FS, Research Note RM-370:1-4.

Elvin-Lewis, M. 1979. *Empirical rationale for teeth cleaning plant selection.* Medical Anthropology (Fall) 1979:431-456.

Farley, G.H., L.M. Ellis, J.N. Stuart, & N.J. Scott, Jr. 1994. *Avian species richness in different-aged stands of riparian forest along the middle Rio Grande, New Mexico.* Conservation Biology 8:1098-1108.

Fleishner, T.L. 1994. *Ecological costs of livestock grazing in western North America.* Conservation Biology 8:629-644.

Hartmann, H.T., D.E. Kesler, & F.T. Davies, Jr. 1990. *Plant propagation principles and practices.* Prentice Hall, Englewood Cliffs, New Jersey. 647 pp.

Hoag, J.C. 1992. *Use of willow and cottonwood cuttings for vegetation shorelines and riparian areas*. USDA NRCS Riparian/Wetland Project Information Series #3, Plant Materials Center, Aberdeen, Idaho.

Hoag, J.C. 1993a. *Selection and acquisition of woody plant species and materials for riparian corridors and shorelines.* Riparian/Wetland Project Information Series #2, USDA, NRCS, Plant Materials Center, Aberdeen, Idaho.

Hoag, J.C. 1993b. *How to plant willows and cottonwood for riparian rehabilitation.* Technical Note #23, USDA, NRCS, Idaho Plant Materials, Boise, Idaho.

James, G.W. 1909 (rev. 1972*). Indian basketry*. Dover Publications, Inc., New York, New York. 271 pp.

Kindscher, K. 1992. *Medicinal wild plants of the prairie. An ethnobotanical guide.* University Press of Kansas. 340 pp.

Kindscher, K. 1987. *Edible wild plants of the prairie. An ethnobotanical guide.* University Press of Kansas. 276 pp.

Knopf, F.I. & F.B. Samson 1994. *Scale perspectives on avian diversity in western riparian ecosystems*. Conservation Biology 8(3):669-676.

Marlow, C.B. & T.M. Pogacnik 1985. *Time of grazing and cattle-induced damage to streambanks*. Pages 279-284. IN Johnson, R.R., C.D. Ziebell, D.R. Patton, P.F. Folliott, and R.H. Hamre. (Tech. Coords.) *Riparian ecosystems and their management: Reconciling conflicting uses.* Proc. First North Am. Riparian Conf., USDA, FS, Gen. Tech. Rep. RM-120. 523 pp.

Martin, A.C., H.S. Zim, & A.L. Nelson 1951. *American wildlife and plants. A guide to wildlife food habits.* Dover Publications, Inc., New York, New York. 500 pp.

Mason, O.T. 1988. *American Indian basketry*. Dover Publications, Inc., New York, New York.

McGregor, R.L., T.M. Barkley, R.E. Brooks, &E.K. Schofield (eds.) 1976. *Flora of the Great Plains*. Great Plains Flora Association. University Press of Kansas. 1402 pp.

Moore, M. 1979. *Medicinal plants of the mountain west.* Museum of New Mexico Press. 200 pp.

Smith, H.H. 1928. *Ethnobotany of the Meskwaki Indians*. Bulletin of the Public Museum of the City of Milwaukee 4(2):175-326.

Stephens, H.A. 1973. *Woody plants of the north central plains*. The University Press of Kansas. 530 pp.

Stevens, L.E., B.T. Brown, J.M. Simpson, & R.R. Johnson 1977. *The importance of riparian habitat to migrating birds*, pp. 156-164. IN Johnson, R.R. & D.A. Jones (Tech. Coords.). *Importance, preservation and management of riparian habitat: a symposium*. USDA, Forest Service, Gen. Tech. Report RM-43, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado. 217 pp.

Tilford, G.L. 1997. *Edible and medicinal plants of the west*. Mountain Press Publishing Company, Missoula, Montana.

USDA, NRCS 1995. *Midwestern wetland flora*. Wetland Science Institute, Laurel, Maryland.

USDA, NRCS 2000. *The PLANTS database*. Version: 000321. <http://plants.usda.gov>. National Plant Data Center, Baton Rouge, Louisiana.

Vestal, P.A. & R.E. Schultes 1939. *The economic botany of the Kiowa Indians*. Botanical Museum, Harvard University, Cambridge, Massachusetts.

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Revised 18jan01 jsp; 03jun03 ahv; 060816 jsp

For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site<http://plants.usda.gov> or the Plant Materials Program Web site <http://Plant-Materials.nrcs.usda.gov>

Peachleaf willow

Salix amygdaloides

Growth Form: irregular
Crown Density: open
Size: to 40 feet high
Drought Resistance: poor
Cold Hardiness: excellent
Growth Rate: rapid
Life Span: moderate
Elevational range: to 9,500 feet
Soil Conditions: moist
Possible Insect Problems: willow and poplar borers
Possible Disease Problems: cytospora canker, leaf rust
Wildlife Value: high: food and cover for birds, browse value for deer, elk & moose
Seasonal Color: not conspicuous
Miscellany: native

Taken from: Trees for Conservation, a buyer's guide, Colorado State Forest Service

Sandbar Willow

Sandbar Willow *(Salix interior)*

General Description

A medium shrub, native along riverbanks, lakes and sloughs throughout most of North Dakota. Suckers profusely.

Leaves and Buds

Bud Arrangement - Alternate.

Bud Color - Greenish-yellow.

Bud Size - 1/8 to 1/4 inch long.

Leaf Type and Shape - Linear to linear-lanceolate.

Leaf Margins - Sharply toothed, the teeth larger, farther apart than on most willows.

Leaf Surface - Smooth, slightly pubescent on juvenile growth.

Leaf Length - 2 to 4 inches.

Leaf Width - 1/4 to 1/2 inch.

Leaf Color - Green, paler beneath.

Flowers and Fruits

Flower Type - 3/4 to 2 inches long, catkins on new leafy branches.

Flower Color - Yellowish-green.

Fruit Type - Capsule, seed attached to cottony hairs.

Fruit Color - Brown and white.

Form

Growth Habit - Medium shrub, rounded, suckers to form a thicket of wispy, slender stems.

Texture - Fine, summer; medium-fine, winter.

Crown Height - 5 to 10 feet.

Crown Width - 5 to 10 feet.

Bark Color - Brownish-tan.

Root System - Fibrous, spreading.

Environmental Requirements

Soils

Soil Texture - Performs best on deep, moist loams; found along stream beds.

Soil pH - 5.5 to 8.0. Adaptable to moderately high pH soils.

Windbreak Suitability Groups- 1, 1K, 2, 2K, 2H.

Cold Hardiness

USDA Zone 3.

Water

Does well in moist sites and survives severe flooding. Not drought tolerant.

Light

Full sun.

Uses

Conservation/Windbreaks

Medium shrub for wildlife plantings. Suckering habit is an advantage for riparian plantings to stabilize stream banks.

Wildlife

Dense thickets provide cover to many wildlife species and game birds. Hoofed browsers may feed on leaves and twigs.

Agroforestry Products

Medicinal - Used for headaches, fever, gout, pain, analgesic, disinfectant, antiseptic and skin ointments. Salicylic acid is active chemical contained in tissues.

Urban/Recreational

Rounded form or thicket for use in wet areas. Suckers profusely and not recommended for use in home landscapes.

Cultivated Varieties

Silver Sands Willow (*Salix interior* 'Silver Sands')

Related Species

Laurel Willow (*Salix pentandra*)

Peachleaf Willow (*S. amygdaloides*)

White Willow (*S. alba*)

Pests

Most willows are susceptible to twig cankers, tar spots, aphids, willow galls and scale insects.

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Plant Fact Sheet

SANDBAR WILLOW

Salix exigua Nutt.

Plant Symbol = SAEX

Contributed by: USDA NRCS Plant Materials Program

Robert H. Mohlenc\brock
USDA NRCS 1989
Midwestern Wetland Flora
@ USDA NRCS PLANTS

Alternate Names
narrowleaf willow

Uses
Erosion control: Sandbar willow is used for streambank and lake shore stabilization and riparian area development or restoration. It is recommended for deep wet lowland, overflow areas, wet meadow sites, streambanks, lake shores, and other areas with a high water table.

Wildlife: This plant is provides wood and shelter for many game birds and forage for deer.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Weediness
This plant may become weedy or invasive in some regions or habitats and may displace desirable vegetation if not properly managed. Please consult with your local NRCS Field Office, Cooperative Extension Service office, or state natural resource or agriculture department regarding its status and use. Weed information is also available from the PLANTS Web site at plants.usda.gov.

Description
Salix exigua Nutt., sandbar willow, is a common native suckering shrub 3 to 20 feet high found throughout the Northern Great Plains and the Northeast US. It quickly forms thickets on sand or gravel deposits along streams, roadside ditches, sloughs, and other places frequent to flooding. Branchlets are reddish brown, smooth or nearly so. Leaves are 2 to 5 inches long, narrowly lance-shaped, and pointed at both ends, with margins that have shallow, widely spaced teeth; they are green and smooth on both surfaces or sometimes silvery-silky. Leafstalks are very short and stipules, if present, are very small. This shrub is dioecious, so male and female flowers are produced by separate plants.

Sandbar willow leaves are very narrow with serrated leaf edges. The leaf edges of purpleosier willow are not serrated, and the leaf width is greater. Also, purpleosier willow does not form thickets.

Note: sandbar willow is an aggressive spreader and this should be considered when selecting materials for a given site. It can spread off of the streambank to other sites under favorable circumstances.

Adaptation and Distribution
Sandbar willow is adapted to sandy soils in stream, river, and shoreline sites, it is not well adapted to other sites.

Sandbar willow is distributed primarily throughout the West. For a current distribution map, please consult the Plant Profile page for this species on the PLANTS Website.

Establishment
Planting 1-0 rooted cuttings or unrooted cuttings are both effective planting methods. The un-rooted cuttings should be used where moisture conditions are good. On droughty sites, the rooted cuttings are preferred. Plant rooted cuttings using techniques that are common to bare root seedlings. Un-rooted cuttings should be at least 12 inches long, with the lower 10 inches buried vertically in the sand. Plant spacing of 2x2 to 4x4 work well.

Sandbar willow is also planted in soil bioengineering systems. It should be planted in mixtures with other species such as 'Streamco' and 'Bankers' willows and 'Ruby' dogwood for live fascines, brush layers and brush mattress.

Under-seeding with a cool season grass mixture is recommended.

Management
Once sandbar willow is planted, it requires little care. Blowouts along the stream should be addressed when they occur and repaired.

Pests and Potential Problems
This willow is susceptible to twig cankers, tar spot, aphids, willow galls, and scale insects.

Cultivars, Improved, and Selected Materials (and area of origin)
'Greenbank' is the only Northeastern cultivar. It was released for commercial production by the Big Flats PMC in 1996. 'Greenbank' is a male clone. It was selected from field testing of several clones, and provided stronger growth over a wide range of conditions.

The cultivar 'Silver Sands' was released by the Bismarck (ND) PMC for use in the Northern Great Plains.

Prepared By & Species Coordinator:
USDA NRCS Northeast Plant Materials Program

Edited: 05Feb2002 JLK; 060817 jsp

For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site<http://plants.usda.gov> or the Plant Materials Program Web site <http://Plant-Materials.nrcs.usda.gov>

Salix acutifolia - Willd.

Common Name	Sharp-Leaf Willow
Family	Salicaceae
Synonyms	S. daphnoides acutifolia.
Known Hazards	None known
Habitats	Not known
Range	N. Europe to E. Asia.
Edibility Rating	
Medicinal Rating	
Care	

Physical Characteristics

Salix acutifolia is a deciduous Shrub growing to 10 m (32ft 10in).
It is hardy to zone 5 and is not frost tender. The flowers are dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required) and are pollinated by Bees.The plant is not self-fertile.

Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

Habitats

Woodland Garden Secondary; Sunny Edge; Dappled Shade;

Edible Uses

Edible Parts: Inner bark; Leaves.
Edible Uses:

Inner bark - raw or cooked. It can be dried, ground into a powder and added to cereal flours for use in making bread etc. A famine food, it is only used when all else fails[172]. Young shoots - cooked. They are not very palatable[172].

Medicinal Uses

Plants For A Future can not take any responsibility for any adverse effects from the use of plants. Always seek advice from a profe medicinally.

Anodyne; Febrifuge.

The fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to This is used as an anodyne and febrifuge[226].

Other Uses

Basketry; Shelterbelt; Soil stabilization.

Stems are very flexible and are used in basket making[46, 61]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. Trees can be planted in shelter-belts for protection against the wind[166]. The extensive root system of this plant is good for binding sandy soils[11].

Cultivation details

Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. Very wind-resistant, tolerating maritime exposure[166]. Hybridizes freely with other members of this genus[200]. Although the flowers are

produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Closely related to S. daphnoides[200] and considered to be a part of that species by some authorities[11, 17]. Some named forms have been developed for their ornamental value[182]. There are also named forms cultivated for basket making[46, 61]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

Propagation

Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of half-ripe wood, June to August in a frame. Very easy.

Modified 30 November 2010

COMMON NAME

WEEPING WILLOW

SCIENTIFIC NAME *Salix babylonica*

FAMILY SALICACEAE

CATEGORY INTRODUCED TREE

WHAT IT LOOKS LIKE:

- Deciduous tree to 20 m high with a spreading crown and drooping branchlets
- Bark grey, becoming deeply furrowed with age
- Leaves 5–13 cm long, 5–25 mm wide with toothed margins, green above, whitish below
- Female catkins 10–20 mm long, appearing in spring along with the new leaves

WHERE IT GROWS & WHY:

- Invasive along riverbanks and wetlands since being introduced to Australia for stream bank stabilisation and shade
- Spreads by seed, or by forming new roots where branches contact soil or are broken off and washed downstream
- Only female plants exist in Australia but they can produce seed by hybridising with other willow species, most of which are declared noxious weeds in all Australian states and territories

MANAGEMENT/SIGNIFICANCE:

- Can obstruct stream flow causing diversion of flood water and erosion of stream banks
- Reduces water quality, especially oxygen levels as leaves decompose after the autumn drop, threatening aquatic plants and animals
- Can displace native vegetation, thus reducing available habitat for wildlife including nesting hollows for birds and snags for fish breeding
- Dense shade can inhibit growth of land and water plants that are part of the native aquatic food chain
- Consumes large volumes of water
- Re-establishment of local native plant species provides increased environmental benefits by improving stream flow and health, and by providing quality habitat for fish and other wildlife

Tree habit and leaf detail:
L.McMahon

Fact Sheet ST-576
October 1994

Salix spp.
Weeping Willow[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

Often when one envisions a quiet body of water, the graceful, elegant form of a Weeping Willow is seen at the water's edge, the long, light green, pendulous branches reflected in the water, gently swaying with each little breeze (Fig. 1). Though it does well in very moist soils, Weeping Willows may also be successfully used as a fast-growing specimen or screen in drier, more open areas where it should receive regular watering to prevent leaf drop in a drought. It will survive drought but loses some leaves without irrigation. Ultimately reaching a height of 35 to 45 feet with an equal or greater spread, Weeping Willow should be given plenty of room to develop its broad, rounded crown.

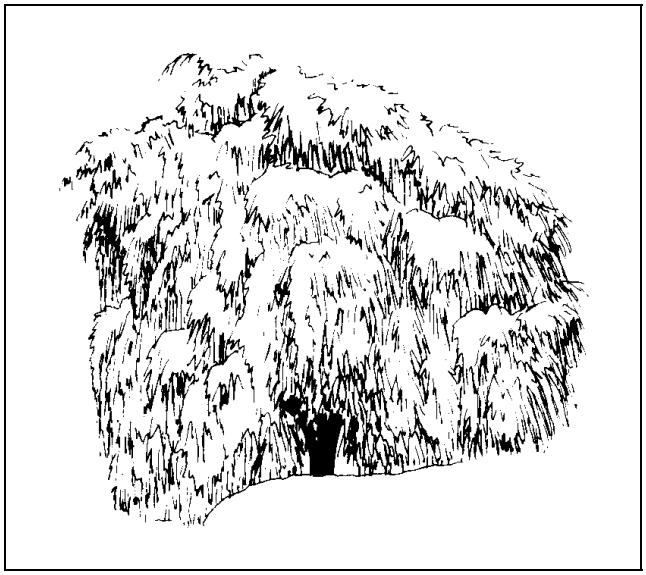

Figure 1. Mature Weeping Willow.

GENERAL INFORMATION

Scientific name: *Salix spp.*
Pronunciation: SAY-licks species
Common name(s): Weeping Willow, Babylon Weeping Willow
Family: *Salicaceae*
USDA hardiness zones: 2 through 9A (Fig. 2)
Origin: not native to North America
Uses: screen; specimen; no proven urban tolerance
Availability: generally available in many areas within its hardiness range

DESCRIPTION

Height: 45 to 70 feet
Spread: 45 to 70 feet
Crown uniformity: symmetrical canopy with a regular (or smooth) outline, and individuals have more or less identical crown forms
Crown shape: round; weeping
Crown density: dense
Growth rate: fast
Texture: fine

1. This document is adapted from Fact Sheet ST-576, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: October 1994.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.

Foliage

Leaf arrangement: alternate
Leaf type: simple
Leaf margin: serrate; serrulate
Leaf shape: lanceolate; linear
Leaf venation: pinnate
Leaf type and persistence: deciduous
Leaf blade length: 4 to 8 inches; 2 to 4 inches
Leaf color: green
Fall color: yellow
Fall characteristic: showy

Flower

Flower color: yellow
Flower characteristics: inconspicuous and not showy; spring flowering

Fruit

Fruit length: < .5 inch
Fruit covering: dry or hard
Fruit color: brown
Fruit characteristics: does not attract wildlife; inconspicuous and not showy; fruit, twigs, or foliage cause significant litter

Trunk and Branches

Trunk/bark/branches: droop as the tree grows, and will require pruning for vehicular or pedestrian clearance beneath the canopy; not particularly showy; should be grown with a single leader; no thorns
Pruning requirement: requires pruning to develop strong structure
Breakage: susceptible to breakage either at the crotch due to poor collar formation, or the wood itself is weak and tends to break
Current year twig color: brown
Current year twig thickness: thin

Culture

Light requirement: tree grows in part shade/part sun; tree grows in full sun
Soil tolerances: clay; loam; sand; acidic; alkaline; extended flooding; well-drained
Drought tolerance: high
Aerosol salt tolerance: high
Soil salt tolerance: good

Other

Roots: surface roots can lift sidewalks or interfere with mowing
Winter interest: no special winter interest
Outstanding tree: not particularly outstanding
Invasive potential: No entries found.
Ozone sensitivity: sensitive or moderately tolerant
Verticillium wilt susceptibility: not known to be susceptible
Pest resistance: long-term health usually not affected by pests

USE AND MANAGEMENT

Care should be taken not to locate Weeping Willows near underground water or sewer lines or close to septic tank drain fields where the roots could cause significant damage. Roots are aggressive and will spread about three times the distance from the trunk to the edge of the canopy and often grow on the soil surface. Weeping Willows are deciduous, the thin, three to six-inch-long leaves turning yellow before falling.

Locate Weeping Willow only where there is adequate space for its large, imposing form. Not for residential lots, it is best located near water where soil will be undisturbed. It is often planted near retention ponds and lakes for a dramatic softening effect.

Willows were used by Indians as medicine, the young twigs and bark chewed to relieve headaches. It was later found the active ingredient was salicylic acid, the basis of today's aspirin.

Weeping Willows should be grown in full sun or very light shade and will tolerate a wide range of soil conditions, including alkaline pH. All willows will need initial pruning and training when young to develop a strong, central trunk with branch crotches as wide as possible. This will increase the longevity of the tree and help overcome the problem with brittle wood but the trees are usually still short-lived to 30-years, or so.

Cultivars include: 'Aurea', with golden-yellow branches; 'Crispa', corkscrew willow, has interesting leaves curled into a ring; 'Golden Curls', moderately weeping, has golden bark with twisting branches and leaves; 'Babylon', excellent, broadly weeping habit; 'Tristis' a popular weeping willow.

Pests

Some of its pests are scales, caterpillars, borers, and aphids. The willow is a favored host for the gypsy moth.

Diseases

Root rot can occasionally infect root systems and cause decline.

Crown gall causes galls to form near the soil line or farther up the plant. Take out infected plants and do not replant in the same area for at least two years.

Willow scab attacks and kills young leaves within a very short time. The fungus enters twigs, kills back the young shoots and causes cankers. Olive green spore masses can be seen along the veins on the undersides of leaves. Another fungus, *Physalospora miyabeana*, attacks willow and the two fungi in combination cause willow blight. Prune out infected branches and use resistant species.

Black canker causes dark brown spots on the leaves. Whitish gray lesions with black borders appear on the twigs and stems. Prune out infected branches and use resistant species. Weeping willow appears to be resistant.

Many fungi cause cankers on willow and infected branches are pruned out. If the trunk is infected and girdled, the tree will die. Keep trees healthy by regular fertilization.

Many fungi cause leaf spots but are not serious enough to warrant preventive sprays. Rake up the fallen diseased leaves in the fall.

Powdery mildew causes a white coating on the leaves. The disease is usually not serious.

Rust causes yellow spots on the lower surface of leaves and, if severe, defoliation. Rake up and destroy leaves from diseased trees.

Tar spot causes black, raised spots on leaves which are harmless. Rake up and dispose of fallen leaves from diseased trees at the end of the growing season.

White Willow

White Willow *(Salix alba)*

General Description

A large, low-branching tree forming a broad, spreading round-topped crown. One of the first to leaf out in spring and last to drop leaves in autumn. The largest tree in North Dakota is 75 feet tall with a canopy spread of 54 feet.

Leaves and Buds

Bud Arrangement - Alternate.

Bud Color - Terminal buds absent, laterals somewhat silky-downy.

Bud Size - 1/5 inch long, rounded at apex, and flattened against the twig with a single, cap-like bud scale.

Leaf Type and Shape - Simple, lanceolate.

Leaf Margins - Finely-serrate.

Leaf Surface - Smooth above, glaucous and silky beneath.

Leaf Length - 1½ to 4 inches.

Leaf Width - 1/4 to 5/8 inch.

Leaf Color - Bright green above, glaucous below.

Flowers and Fruits

Flower Type - Catkin.

Flower Color - Light green to yellowish.

Fruit Type - Cottony or silky hairy seeds.

Fruit Color - Greenish-yellow.

Form

Growth Habit - Low branching tree with long and flexible limbs.

Texture - Fine, summer; medium, winter.

Crown Height - 40 to 65 feet.

Crown Width - 30 to 50 feet.

Bark Color - Yellowish-brown to brown, ridged and furrowed.

Root System - Shallow and wide-spreading.

Environmental Requirements

Soils

Soil Texture - Performs best on moist, deep loams along stream beds and wetlands.

Soil pH - 5.5 to 8.0.

Windbreak Suitability Group - 1, 1K, 2, 2K, 2H.

Cold Hardiness

USDA Zone 2.

Water

Does well on moist sites and survives severe flooding. Often dies back during periods of extended drought.

Light

Full sun to partial shade.

Uses

Conservation/Windbreaks

Medium to tall tree for field and farmstead windbreaks and riparian plantings.

Wildlife

Very good for wildlife. Used as food and cover for a wide variety of wetland wildlife.

Agroforestry Products

Wood - Pallets, crates, unexposed furniture parts, cooperage, wooden ware, carving and firewood.

Medicinal - Early Americans and Europeans used extracts for headaches, fever, gout and pain. Willow is a source of salicin which is broken down to salicylic acid, the main component in aspirin.

Urban/Recreational

Wet areas in parks and other landscape sites.

Cultivated Varieties

Golden Willow (*Salix alba* 'Vitellina') - Yellow-twigged selection.

Redstem Willow (*S. alba* 'Chermesina') - Red-twigged, more upright selection.

Siberian White Willow (*S. alba* 'Sericea') - Long silky hairs on leaves impart a silvery-gray color to foliage.

Weeping Golden Willow (*S. alba* 'Tristis') - Popular specimen yard tree but very messy due to twig drop.

Related Species

Peachleaf Willow (*S. amygdaloides*)

Laurel Willow (*S. pentandra*)

Pests

Common diseases include Cytospora canker and stem decay.

Winterberry Euonymus

Winterberry Euonymus *(Euonymus bungeana)*

General Description

A small tree or large rounded shrub with semi-pendulous branches. Native to Manchuria and northern China. Showy pink fruits, opening to expose reddish seeds. Attractive gray bark. The largest shrubs in North Dakota are 13 feet tall with a canopy spread of 12 feet.

Leaves and Buds

Bud Arrangement - Opposite to subopposite, terminal outer bud scales upright creating a stockade-like appearance around meristem, lateral buds imbricate, appressed.

Bud Color - Green to purple-brown.

Bud Size - Medium to small.

Leaf Type and Shape - Simple, elliptic-ovate to elliptic-lanceolate.

Leaf Margins - Acuminate, broad cuneate at base, serrulate.

Leaf Surface - Smooth, glabrous.

Leaf Length - 2 to 4 inches.

Leaf Width - 3/4 to 1½ inches.

Leaf Color - Light to average green; red-purple fall color.

Flowers and Fruits

Flower Type - Cymes on stalks 1 to 1½ inches long.

Flower Color - Yellowish.

Seed Type - Pinkish lobed capsules.

Seed Color - Pink capsules open in mid-autumn to display orange-scarlet arils which are very persistent and colorful after leaves fall.

Form

Growth Habit - Rounded in form with semi-pendulous branches.

Texture - Medium-fine, summer; medium-fine, winter.

Crown Height - 10 to 15 feet.

Crown Width - 10 to 15 feet.

Bark Color - Young stems, greenish, slender, glabrous, almost round, often with slight corky lines. Major stems have distinctive grayish bark.

Root System - Medium in depth.

Environmental Requirements

Soils

Soil Texture - Adapted to a variety of soil types.

Soil pH - 5.0 to 7.5.

Windbreak Suitability Group - 1, 2, 3, 4, 4C, 5.

Cold Hardiness

USDA Zone 4, possibly 3.

Water

Medium in moisture requirements.

Light

Full sun to partial shade.

Uses

Conservation/Windbreaks

Large shrub or small tree for farmstead windbreaks and riparian plantings.

Wildlife

Nesting site for songbirds; fruits toxic if eaten.

Agroforestry Products

Wood - Used in making pipestems, charcoal and gunpowder.

Medicinal - Some *Euonymus* species are used as a laxative, hepatic stimulant, heart medicine, and diuretic. Contains Euonymin which in small dosages stimulates the appetite.

Urban/Recreational

Used for patio trees, border plantings, screen plantings, or single specimen.

Cultivated Varieties

Current named cultivars are borderline in hardiness in North Dakota, but NDSU plans to release a hardier landscape selection with showy fruits.

Related Species

Eastern Wahoo (*Euonymus atropurpurea*)

Pests

No major pest problems in North Dakota State University trials, but Euonymus scale further east. Extracts of various *Euonymus* species are toxic to insect pests.

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Plant Guide

AMERICAN SILVERBERRY

Elaeagnus commutata Bernh. ex Rydb.

Plant Symbol = ELCO

Contributed By: USDA NRCS National Plant Data Center & the Biota of North America Program

Jeanne Russell Janish
Used with permission of the publishers

Abrams (1951)

Alternate common names
Silverberry, wolf-willow

Uses
Wildlife/Livestock: American silverberry is an important wildlife food for moose, elk, mule deer and white-tailed deer, pronghorn, upland game birds, small nongame birds, small mammals, and waterfowl. Its palatability is rated poor for cattle and horses and fair for sheep. American silverberry also provides protection and nesting cover for these same animals, particularly in grasslands and other mostly open habitats. In mature White Spruce forests of the Yukon Territory, it provides important habitat for snowshoe hares.

Ethnobotany: The fleshy fruit of American silverberry is cooked in moose fat and eaten by some Alaskan natives. The pits of the fruits are used as necklace beads in the Fort Yukon region of Alaska.

Conservation: The vigorous rhizomatous habit of American silverberry helps it spread quickly in disturbed sites, and it has been used for soil stabilization of mine spoils in British Columbia and Alberta. Pre-inoculation with mycorrhizal and nitrogen-fixing symbionts may result in more rapid revegetation.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status and wetland indicator values.

Description
General: Oleaster family (Elaeagnaceae). Long-lived shrubs, growing 1-4 m tall, rarely small trees, strongly rhizomatous, and stoloniferous, sometimes forming thickets or loose colonies, the branches thornless, reddish brown, sparsely to densely covered with silvery scales. Leaves are deciduous, simple, alternate, 2-10 cm long, ovate to oblong or ovate-lanceolate, wedge-shaped at base, short petioled, both surfaces covered by minute, silver scales, sometimes with scattered brown scales beneath. Flowers are bisexual or unisexual, sweet-scented, short-stalked in lateral clusters of 1-3 on twigs of the current year; petals absent, the sepals forming a 4-lobed tube from the top of the developing fruit (the ovary inferior), yellowish inside, silvery outside, 12-15 mm long. Fruits are ovate to ellipsoid, 8-10 mm long, silvery-covered with a dry mealy flesh covering a single, ellipsoid stone. North American native with fruits covered by silver scales.

Distribution
American silverberry is distributed across northern North America, from Alaska, Yukon Territory, and the Northwest Territories through Canada, except for the easternmost provinces (New Brunswick, Nova Scotia, Newfoundland), and in the United States from Washington to Minnesota and southward to northeastern Utah and Colorado. "Escapes"

(presumably from cultivation) occur in Texas and Kentucky. Although the species is wide-ranging, the plants usually are uncommon to rare and local where they occur. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Adaptation
American silverberry commonly occurs in riparian communities along watercourses and is ranked as a facultative wetland species in Alaska. It also grows in open grasslands and a variety of open forests and thickets. Because of its relative shade intolerance, it usually is found in open vegetation, particularly where soil disturbance has occurred. It is a dominant species and indicator of relatively young (6-19 years old) quaking aspen parkland communities in the Canadian Prairie Provinces. The tough leaves, with their dense and close cover of scales, probably are at least partially responsible for the drought resistance of silverberry. Plants also are wind resistant and tolerate temperatures down to about -40°C.

Although it grows best in loamy soils, American silverberry is commonly found in dry, sandy or gravelly soils, including those highly susceptible to erosion. The species occurs over a wide range of elevation (300-8000 feet). Flowering in June-August; fruiting mostly August-October.

Establishment
Seeds are produced in good crops every 1-2 years. They remain viable 1-2 years or more and germination may require a natural stratification period of nearly two years. Birds are the primary seed dispersers. American silverberry also reproduces and spreads by rhizomes.

Plants cut back severely to old wood can still regenerate. Cuttings are slow and difficult to root, usually requiring at least 12 months for good establishment.

Management
American silverberry fixes nitrogen, some of which is available to plants of other species growing nearby. In rough fescue grasslands, silverberry at 1,000 stems per acre increases forage production. It can be grown in orchards to increase yields from fruit trees by up to 10%.

American silverberry is an “increaser” species on overgrazed cattle rangelands, and where silverberry was a minor component 20 years ago in rough fescue grasslands of Alberta and Saskatchewan, it is now widely distributed. Frequent sheep browsing or mowing, however, reduce silverberry cover. Many passerine bird species are attracted to mixed-grass prairie with interspersed silverberry cover and reduction of silverberry results in reduced or altered composition of bird communities.

In native grasslands, American silverberry is often controlled with herbicides or fire. It is top-killed by most fires and is probably completely killed by severe fires. In the Canada Great Plains, American silverberry is described as a species "seriously harmed by spring and fall burns." Plants sprout from rhizomes after fire, and although numbers of plants may increase after fire, cover usually decreases and recovers slowly. Presettlement fires probably occurred every 5-10 years in grasslands where American silverberry is a common shrub. More frequent burning reduces silverberry cover, but patches of shrubs can be maintained by employing partial burns.

Pests and Potential Problems
American silverberry is heavily rusted in Canada and is also a host for pycnia and aecia of *Puccinia coronata* (crown rust) and *Puccinia caricis-sherpherdiae*. An unidentified species of *Calamagrostis* was found to be a uredinial and telial host for *Puccinia coronata* found on *E. commutata*.

Cultivars, Improved and Selected Materials (and area of origin)
These plant materials are readily available from commercial sources. Contact your local NRCS office for more information.

References
Abrams, L. 1951. *Illustrated flora of the Pacific Northwest.* Vol. III. Stanford University Press, Palo Alto, California.

Bailey, A.W. 1970. *Barrier effect of the shrub Elaeagnus commutata on grazing cattle and forage production in central Alberta*. J. Range Managemt. 23:248-251.

Esser, L.L. 1994. *Elaeagnus commutata*. In: W.C. Fischer, compiler. The Fire Effects Information System [Data base]. U.S. Dept. of Agric., Forest Service, Intermountain Research Station, Intermountain Fire Sciences Lab., Missoula, Montana. <http://www.fs.fed.us/database/feis/>

Graham, S.A. 1964. *The Elaeagnaceae in the southeastern United States.* J. Arnold Arb. 45:274-278.

Scianna, J.D. (Sept.) 1999. *Description, propagation and use of silverberry (Elaeagnus commutata). Montana Technical Note 33*. USDA, NRCS Bridger Plant Materials Center, Bridger, Montana. 5p.
Soper, J.H. & M.L. Heimburger 1982. *Shrubs of Ontario*. Life Sciences Misc. Publ. Royal Ontario Museum, Toronto, Ontario, Canada.

Stephens, H.A. 1973. *Woody plants of the North Central Plains*. The University Press of Kansas, Lawrence, Kansas.

Vories, K.C. 1981. *Growing Colorado plants from seed: a state of the art*. Vol. I. Shrubs. Gen. Tech. Rep. INT-103. U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station, Ogden, Utah.

Watson, L.E., R.W. Parker, & D.F. Polster 1980. *Manual of plant species suitablity for reclamation in Alberta*. Vol. 2. *Forbs, shrubs and trees*. Land Conservation and Reclamation Council. Edmonton, Alberta, Canada.

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For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site<http://plants.usda.gov> or the Plant Materials Program Web site <http://Plant-Materials.nrcs.usda.gov>

Elaeagnus commutata - Bernh. ex Rydb.

Common Name	Silverberry
Family	Elaeagnaceae
Synonyms	E. argentea. non Moench.
Known Hazards	None known
Habitats	Dry calcareous slopes[43, 184].
Range	N. America - Quebec to Alaska and south to Utah, S. Dakota and Minnesota..
Edibility Rating	
Medicinal Rating	
Care	

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Summary

Physical Characteristics

Elaeagnus commutata is a deciduous Shrub growing to 3 m (9ft) by 1.5 m (5ft) at a medium rate.
It is hardy to zone 2 and is not frost tender. It is in flower in May, and the seeds ripen from Jul to September. The flowers are hermaphrodite (have both male and female organs) and are pollinated by Bees.It can fix Nitrogen.

Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: acid, neutral and basic (alkaline) soils and can grow in very alkaline soils.
It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

Habitats

Woodland Garden Sunny Edge; Dappled Shade; Hedge;

Edible Uses

Edible Parts: Fruit; Seed.
Edible Uses:

Fruit - raw or cooked[1, 2, 3, 43, 106]. Dry and mealy[11, 95, 172, 183]. Good when added to soups they also make an excellent jelly[183]. The fruit must be fully ripe before it can be enjoyed raw, if even slightly under-ripe it will be quite astringent[K]. The fruit contains a single large seed[K]. Seed - raw or cooked. It can be eaten with the fruit though the seed case is rather fibrous[K].

Medicinal Uses

Plants For A Future can not take any responsibility for any adverse effects from the use of plants. Always seek advice from a professional before using a plant medicinally.

Cancer; Salve; VD.

A strong decoction of the bark, mixed with oil, has been used as a salve for children with frostbite[257]. A decoction of the roots, combined with sumac roots (Rhus spp.), has been used in the treatment of syphilis[257]. This medicine was considered to be very poisonous and, if you survived it, you were likely to become sterile[257]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

Other Uses

Beads; Fibre; Hedge; Hedge; Soap.

Plants can be grown as a hedge in exposed positions, tolerating maritime exposure. They have a rather open habit, however, and so do not afford a lot of wind protection. Because they fix atmospheric nitrogen, they enrich the soil and so make a very good companion hedge in orchards etc[K]. The fibrous bark is used in weaving, it has been twisted to make strong ropes and has also been used to make blankets and clothing[99, 257]. Dried fruits are used as beads[99, 257]. The berries have been used to make a soap[257].

Cultivation details

An easily grown plant, it succeeds in most soils that are well-drained[200], though it dislikes shallow chalk soils[98]. This last report conflicts rather with the record of its natural habitat, it should grow well on chalk[K]. Prefers a light sandy soil that is only moderately fertile, succeeding in poor and dry soils[11, 200]. Requires a position in full sun[11, 200]. Plants are very drought and wind resistant[1, 11, 200]. A very hardy plant, tolerating temperatures down to about -40°c[184]. However, plants prefer a continental climate and are liable to be cut back in severe winters in Britain mainly because the wood is not fully ripened in our cooler summers. A moderately fast-growing plant[202]. The small flowers are deliciously scented[245]. This species does not normally require pruning but the plant can regenerate from very old wood and so can be cut back severely if required[202]. Plants resent root disturbance and should be placed in their permanent positions as soon as possible[202]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%. Often confused with E. angustifolia even though it is very distinct[50]. Plants produce suckers quite freely, often sending them up at some distance from the plant[182, K]. This species is notably resistant to honey fungus[88, 200].

Propagation

Seed - best sown as soon as it is ripe in a cold frame[78]. It should germinate in late winter or early spring, though it may take 18 months[K]. Stored seed can be very slow to germinate, often taking more than 18 months. A warm stratification for 4 weeks followed by 12 weeks cold stratification can help[98]. The seed usually (eventually) germinates quite well[78]. Prick out the seedlings into individual pot as soon as they are large enough to handle and plant out when they are at least 15cm tall. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Cuttings of mature wood of the current year's growth, 10 - 12cm with a heel, October/November in a frame[200]. The cuttings are rather slow and difficult to root, leave them for 12 months[113]. Layering in September/October. Takes 12 months[78]. Division of suckers during the dormant season[3, 11]. The larger suckers can be planted out direct into their permanent positions, but it is probably best to pot up smaller suckers and grow them on in a cold frame until they are established.

Plant Suppliers: Click here for a List

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Expert comment

Author

Bernh. ex Rydb.

Botanical References

1143200

Links / References

[K] **Ken Fern** Notes from observations, tasting etc at Plants For A Future and on field trips.

[1]**F. Chittendon.** RHS Dictionary of Plants plus Supplement. 1956
Comprehensive listing of species and how to grow them. Somewhat outdated, it has been replaces in 1992 by a new dictionary (see [200]).

[2]**Hedrick. U. P.** Sturtevant's Edible Plants of the World.
Lots of entries, quite a lot of information in most entries and references.

[3]**Simmons. A. E.** Growing Unusual Fruit.
A very readable book with information on about 100 species that can be grown in Britain (some in greenhouses) and details on how to grow and use them.

[11]**Bean. W.** Trees and Shrubs Hardy in Great Britain. Vol 1 - 4 and Supplement.
A classic with a wealth of information on the plants, but poor on pictures.

[43]**Fernald. M. L.** Gray's Manual of Botany.
A bit dated but good and concise flora of the eastern part of N. America.

[50]**?** Flora Europaea
An immense work in 6 volumes (including the index). The standard reference flora for europe, it is very terse though and with very little extra information. Not for the casual reader.

[78]**Sheat. W. G.** Propagation of Trees, Shrubs and Conifers.
A bit dated but a good book on propagation techniques with specific details for a wide range of plants.

[88]**RHS.** The Garden. Volume 112.
Snippets of information from the magazine of the RHS. In particular, there are articles on plants that are resistant to honey fungus, oriental vegetables, Cimicifuga spp, Passiflora species and Cucurbits.

[95]**Saunders. C. F.** Edible and Useful Wild Plants of the United States and Canada.
Useful wild plants of America. A pocket guide.

[98]**Gordon. A. G. and Rowe. D. C. f.** Seed Manual for Ornamental Trees and Shrubs.

Very comprehensive guide to growing trees and shrubs from seed. Not for the casual reader.

[99]**Turner. N. J.** Plants in British Columbian Indian Technology.
Excellent and readable guide.

[106]**Coon. N.** The Dictionary of Useful Plants.
Interesting reading but short on detail.

[113]**Dirr. M. A. and Heuser. M. W.** The Reference Manual of Woody Plant Propagation.
A very detailed book on propagating trees. Not for the casual reader.

[172]**Schofield. J. J.** Discovering Wild Plants - Alaska, W. Canada and the Northwest.
A nice guide to some useful plants in that area.

[182]**Thomas. G. S.** Ornamental Shrubs, Climbers and Bamboos.
Contains a wide range of plants with a brief description, mainly of their ornamental value but also usually of cultivation details and varieties.

[183]**Facciola. S.** Cornucopia - A Source Book of Edible Plants.
Excellent. Contains a very wide range of conventional and unconventional food plants (including tropical) and where they can be obtained (mainly N. American nurseries but also research institutes and a lot of other nurseries from around the world.

[184]**Phillips. R. & Rix. M.** Shrubs.
Excellent photographs and a terse description of 1900 species and cultivars.

[200]**Huxley. A.** The New RHS Dictionary of Gardening. 1992.
Excellent and very comprehensive, though it contains a number of silly mistakes. Readable yet also very detailed.

[202]**Davis. B.** Climbers and Wall Shrubs.
Contains information on 2,000 species and cultivars, giving details of cultivation requirements. The text is terse but informative.

[214]**Matthews. V.** The New Plantsman. Volume 1, 1994.
A quarterly magazine, it has articles on Himalayacalamus hookerianus, hardy Euphorbias and an excellent article on Hippophae spp.

[245]**Genders. R.** Scented Flora of the World.
An excellent, comprehensive book on scented plants giving a few other plant uses and brief cultivation details. There are no illustrations.

[257]**Moerman. D.** Native American Ethnobotany
Very comprehensive but terse guide to the native uses of plants. Excellent bibliography, fully referenced to each plant, giving a pathway to further information. Not for the casual reader.

Readers comment

Elizabeth H.
David G Sat Aug 12 2006
This species also has the common name "Wolf Willow" in Canada, and perhaps elsewhere. Note the height listed is low: this shrub/tree often reaches 5 metres.

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Subject : Elaeagnus commutata

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