Common Name	Scientific Name	References (See at end of each section)									
		ND	NRCS	NRCS	NRCS	TFC	PFAF	FG	Other	Other	Other
Apple, Prairie Yellow	*Malus ioensis*						PFAF				
Apricot, Hardy	*Prunus armeniaca*	ND									
Arrowwood	*Vibernum dentatum*	ND						FG			
Ash, Green	*Fraxinus pennsylvanica*	ND									
Ash, Mountain	*Sorbus acupuaria*	ND									
Aspen	*Populus tremuloides*	ND		PG		TFC					
Birch, Paper	*Betula papyifera*	ND		PG							
Boxelder	*Acer negundo*	ND									
Buckeye, Ohio	*Aesculus glabra*	ND		PG							
Buffaloberry	*Shepherdia argentea*	ND			PFS	TFC					
Caragana (Siberian Pea Shrub)	*Caragana arborescens*	ND		PG		TFC					
Cherry, Black	*Prunus serotina*			PG					OHDNR		
Cherry, Carmine Jewel	*Prunus var. Carmen Jewel*								DUTCH		
Cherry, Mayday	*Prunus padus*								DUTCH		
Cherry, Nanking	*Prunus tomentosa*	ND				TFC					
Cherry, Pin	*Prunus pennsylvanica*								?		
Cherry, Sand	*Prunus besseyi*	ND				TFC					
Chokeberry, Black	*Aronia melanocarpa*							FG			
Chokecherry, Common	*Prunus virginiana*	ND		PG		TFC					
Chokecherry, Schubert	*Prunus virginiana 'Schubert'*							FG			
Cotoneaster, Pekin	*Cotoneaster lucidus*	ND				TFC					
Cottonwood, Native	*Populus deltoides*	ND			PFS				?		
Cottonwood, Siouxland	*Populus x 'Siouxland'*								MNDOT		
Cottonwood, Silver	*Populus alba*										
Crabapple, Dolgo	*Malus x hybrid*	ND							SCHMIDT		
Crabapple, Midwest Manchurian	*Malus baccata var. mandishurica 'Midwest'*			PG					MSU		
Crabapple, Siberian	*Malus baccata sp.*	ND									
Cranberry	*Viburnum trilobum*	ND						FG			
Currant, Black Riverview	*Ribes americanum 'Riverview'*			PG							
Currant, Golden	*Ribes odoratum*	ND		PG		TFC					
Dogwood, Gray	*Cornus amomum 'Indigo'*	ND			PFS						
Dogwood, Indigo Silky	*Cornus racemosa*		PMP		PFS						
Dogwood, Redosier	*Cornus sericea*	ND		PG		TFC		FG			
Elderberry, American	*Sambucus canadensis*				PFS			FG			
Elm, Siberian	*Ulmus pumila*	ND			PFS	TFC					
Hackberry, Common Northern	*Celtis occidentalis*	ND			PFS	TFC					
Hackberry, Oahe	*Celtis occidentalis 'Oahe'*		PMP								
Hawthorne, Downy	*Crategus mollis*								UWis		
Hawthorne, Homestead Arnold	*Crategus mollis arnoldiana*	ND									
Hazelnut	*Corylus avellana*								Uconn		
Honeylocust, Thornless	*Gleditsia triacanthos inermis*	ND			PFS	TFC		FG			
Honeysuckle, Arnold's Red	*Lonicera tarica 'Arnolds Red'*	?									
Honeysuckle, Freedom	*Lonicera x 'Freedom*	ND									
Indigo, False	*Amorpha fruitocosa*	ND		PG							
Ironwood	*Ostrya virginiana*	ND									
Juneberry (Serviceberry)	*Amelanchier alnifolia*	ND		PG							
Lilac, Common	*Syringa vulgaris*	ND		PG			TFC				
Lilac, Legacy	*Syringa villosa 'Legacy'*	ND		PG							
Linden, American	*Tilia americana*	ND		PG				FG			
Linden, Littleleaf	*Tilia cordata*	ND									
Locust, Black	*Robinia pseudoacacia*				PFS						
Maple, Amur	*Acer ginnala*	ND		PG							
Maple, Northern Sugar	*Acer saccharum*			PG							
Maple, Red	*Acer rubrum*				PFS			FG			

Maple, Silver	*Acer saccarinum*	ND			PFS						
Maple, Tatarian	*Acer tataricum*	ND									
Nannyberry	*Viburnum lentago*	ND			PFS						
Oak, Bur	*Quercus macrocarpa*	ND			PFS	TFC					
Oak, Red	*Quercus rubra*			PG							
Oak, Swamp White	*Quercus bicolor*			PG							
Pear, McDermand Ussurian	*Pyrus ussuriensis 'McDermand'*	ND									
Plum, American	*Prunus americana*	ND			PFS	TFC					
Poplar, Hybrid	*Populus sp.*	ND				TFC					
Rose, Hansen Hedge	*Rosa sp. 'Hansen'*	ND									
Rose, Prairie Rose	*Rosa arkansana*						PFAF		MW		
Rose, Woods	*Rosa woodsii*			PG							
Seaberry	*Hippophae rhamnoides*	ND									
Sumac, Aromatic	*Rhus aromatica*	ND		PG				FG			
Sumac, Konza	*Rhus aromatica var serotina*		PMP								
Sumac, Smooth	*Rhus glabra*	ND			PFS						
Sumac, Staghorn	*Rhus typhina*	ND			PFS			FG			
Sycamore	*Platanus occidentalis*			PG							
Walnut, Black	*Juglans nigra*	ND			PFS						
Willow, Golden	*Salix alba 'Vitellina'*	ND				TFC					
Willow, Laurelleaf	*Salix pentandra*	ND									
Willow, Peachleaf	*Salix amygdaloides*			PG		TFC					
Willow, Sandbar	*Salix exigua*	ND			PFS						
Willow, Sharpleaf	*Salix acutifolia*						PFAF				
Willow, Weeping	*Salix alba*								PADD	USFS	
Willow, Encampment White	*Salix alba 'Encampment'*	ND									
Winterberry	*Euonymus bungeana*	ND									
Wolfberry (Silverberry)	*Elaeagnus commutata*			PG			PFAF				
VINES											
Grape, Riverbank	*Vitis riparia*						PFAF		PDW		
Woodbine	*Parthenocissus inserta*				PFS					LIND	
CONIFERS											
Cedar, Eastern Red	*Juniperus virginiana*	ND			PFS	TFC					
Juniper, Rocky Mtn	*Juniperus scopulorum*	ND			PFS	TFC					
Pine, Eastern White	*Pinus strobus*				PFS						
Pine, Ponderosa	*Pinus ponderosa*	ND		PG							
Pine, Red	*Pinus resinosa*				PFS						
Pine, Scotch (Scots)	*Pinus sylvestris*	ND			PFS	TFC					
Spruce, Black Hills	*Picea glauca var. densata*	ND		PG							
Spruce, Colorado Blue	*Picea pungens*	ND		PG		TFC					
Spruce, Norway	*Picea abies*	ND							MBG	USFS	NS.Com

Malus ioensis - (A.W.Wood.)Britton.

Common Name	Prairie Crab
Family	**Rosaceae**
Synonyms	Pyrus ioensis.
Known Hazards	All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.
Habitats	Open woods, thickets, pastures, along

USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. An illustrated flora of the northern United States, Canada and the British Possessions. 3 vols. Charles Scribner's Sons, New York. Vol. 2

www.forestryimages.org

	streams etc, with a preference for calcareous soils[228].
Range	Central N. America - Indiana to Minnesota, south to Texas and Louisiana.
Edibility Rating	
Medicinal Rating	
Care	

Summary

Physical Characteristics

Malus ioensis is a deciduous Tree growing to 5 m (16ft) by 5 m (16ft) at a slow rate.
It is hardy to zone 2 and is not frost tender. It is in flower from May to June, and the seeds ripen in October. The flowers are hermaphrodite (have both male and female organs) and are pollinated by Insects.It is noted for attracting wildlife.

Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

Habitats

Woodland Garden Secondary; Sunny Edge; Dappled Shade;

Edible Uses

Edible Parts: Fruit.

Edible Uses:

Fruit - raw or cooked[105, 159, 183, 257]. Up to 4cm in diameter[229]. Harsh and astringent[1, 227, K], it is best baked or made into preserves. It makes excellent jellies and cider[229].

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.

None known

Other Uses

Wood.

Wood - heavy. Of no commercial importance[229].

Cultivation details

An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Dislikes chalky soils, this is especially true for the cultivar 'Plena'[200]. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. A slow-growing and short-lived species in the wild[229], it produces suckers from the roots and often forms thickets[228]. This species is closely related to M. coronaria[1]. It hybridizes freely with other members of the genus[200]. There are many named forms, selected for their ornamental value[200]. The fruit is a good wildlife food source, especially for birds[200]. The plant fruits very heavily in southern Britain[K]. Plants in this genus are notably susceptible to honey fungus[200].

Propagation

Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

Manchurian Apricot

Manchurian Apricot *(Prunus armeniaca var. mandshurica)*

General Description

Small fast-growing tree. Rounded, spreading form, winter-hardy, and drought resistant. Native to Manchuria and Korea. Attractive white flowers, golden orange fall color and edible fruit. Early flowering makes fruit production susceptible to spring frost damage. The largest tree in North Dakota is 26 feet tall with a canopy spread of 32 feet.

Leaves and Buds

Bud Arrangement - Alternate.

Bud Color - Brownish.

Bud Size - Small.

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

Leaf Margins - Sharply and doubly serrate, with narrow, elongated teeth.

Leaf Surface - Glossy, smooth above; axillary tufts of hairs, below.

Leaf Length - 2 to 4½ inches.

Leaf Width - 1½ to 3½ inches.

Leaf Color - Light green on both surfaces; yellow to orange fall color.

Flowers and Fruits

Flower Type - Solitary, about 1 inch across.

Flower Color - Varying from almost white to pink.

Fruit Type - Subglobose, peach-like drupe, can be eaten but is best suited for preserves.

Fruit Color - Fruits are yellow sometimes with a blush of red.

Form

Growth Habit - Spreading.

Texture - Medium, summer; medium, winter.

Crown Height - 10 to 15 feet.

Crown Width - 12 to 18 feet.

Bark Color - Reddish-brown to cinnamon-brown.

Root System - Medium in depth, and spread.

Environmental Requirements

Soils

Soil Texture - Grows best in loam soils.

Soil pH - 6.0 to 7.5.

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

Cold Hardiness

USDA Zone 3.

Water

Moderately drought tolerant. Will not withstand ponding or saturated soils.

Light

Full sun.

Uses

Conservation/Windbreaks

Small tree for farmstead windbreaks.

Wildlife

Nesting site for songbirds. Rabbits and other rodents can cause serious injury during winter.

Agroforestry Products

Food - Used fresh, processed and dried.

Medicinal - A source of phloretin, an antibiotic. Used in cosmetics, soaps, and cold creams. Some *Prunus* species have been used for coughs, colds, gout and cancer research.

Urban/Recreational

Used as a specimen or as a screen. Fruits may be objectionable if used as a boulevard tree.

Cultivated Varieties

Mandan Apricot (*Prunus armeniaca var. mandshurica* 'Mandan') - Released by USDA, Northern Great Plains Research Station, Mandan, North Dakota. A cultivar seed strain.

Moongold / Sungold Apricot (*P.* x 'Moongold' and 'Sungold') - Released by University of Minnesota, St. Paul, Minnesota.

Siberian Apricot (*P. armeniaca* var. *sibirica*)

Related Species

American Plum (*Prunus americana*)

Pests

No major pest problems. Extracts of *Prunus* species are toxic to some insect pests.

Arrowwood Viburnum

Arrowwood Viburnum *(Viburnum dentatum)*

General Description

A dense round shrub which has a tendency to produce large numbers of basal stems. Currently available seed sources generally are not adapted to North Dakota.

Leaves and Buds

Bud Arrangement - Opposite.

Bud Color - Brownish, imbricate buds.

Bud Size - Small, glabrous.

Leaf Type and Shape - Simple, suborbicular to ovate.

Leaf Margins - Coarsely-dentate.

Leaf Surface - Glabrous and semi-glossy above, glabrous beneath or bearded in the axils of the veins.

Leaf Length - 1 to 3 inches.

Leaf Width - 1 to 2½ inches.

Leaf Color - Dark green; red fall color.

Flowers and Fruits

Flower Type - Flat-topped cymes.

Flower Color - White, but the yellow stamens impart a creamy color rather than pure white.

Fruit Type - Drupes, in flattened clusters.

Fruit Color - Porcelain-blue to bluish-black.

Form

Growth Habit - Multi-stemmed, dense shrub with upright, finally arching branches.

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

Crown Height - 6 to 10 feet.

Crown Width - 6 to 10 feet.

Bark Color - Glabrous at maturity, gray, leaf scars with ciliate hairs around the margins.

Root System - Somewhat shallow, fibrous.

Environmental Requirements

Soils

Soil Texture - Adapted to a variety of soil types.

Soil pH - 4.0 to 6.5. Prefers acid soils. May become chlorotic in alkaline sites.

Windbreak Suitability Group - 1, 3.

Cold Hardiness

USDA Zone 3.

Water

Prefers moist, well-drained sites, very limited drought tolerance.

Light

Full sun to partial shade.

Uses

Conservation/Windbreaks

Medium shrub for farmstead windbreaks and riparian plantings.

Wildlife

Birds like the fruits. Seeds are found germinating in many out-of-the-way places.

Agroforestry Products

Wood - Native Americans used stems for arrows.

Food - Fruits of several *Viburnum* species are processed into jams.

Medicinal - Some *Viburnum* species are used as a nerve sedative, anti-spasmodic for asthma and for stomach troubles, colic and hysteria.

Urban/Recreational

Good in hedges, groupings, masses. Filler in shrub borders.

Cultivated Varieties

Chicago Luster™ Arrowwood (*Viburnum dentatum* 'Synnestvedt') - A new cultivar with superior glossy leaves.

Related Species

American Cranberrybush (*Viburnum trilobum*)

European Cranberrybush (*V. opulus*) - Susceptible to snowball aphid twig and leaf distortion.

Nannyberry Viburnum (*V. lentago*)

Rafinesque Arrowwood (*V. rafinesquianum*) - Similar to *V. dentatum*, but better adapted and more drought tolerant in Northern Plains.

Wayfaringtree Viburnum (*V. lantana*) - Not very drought tolerant, showy red fruit clusters.

Pests

No major pest problems.

Arrowwood

Viburnum dentatum (Arrowwood viburnum)

Hardiness Zones: 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11

Botanical Name: *Viburnum dentatum* vy-BURN-um den-TAY-tum **Common Name:** Arrowwood viburnum

Genus: *Viburnum*

This woody, multi-stemmed, deciduous shrub has a rounded shape and grows 5 to 9 feet tall and wide. It has toothed leaves and small, creamy white flowers in May to June that mature to bluish black spherical fruits.

Noteworthy characteristics: Arrowwood viburnum is useful in mass plantings and groupings. It's easy to transplant.

Care: Highly adaptable, it can take some shade but prefers full sun.

Propagation: Take greenwood cuttings in summer.

Problems: Gray mold (Botrytis), rust, downy mildew, powdery mildew, wood rot, Verticillium wilt, leaf spots, and dieback. Aphids, scale insects, weevils, Japanese beetles, mealybugs, Viburnum beetle, tree hoppers.

Height	6 ft. to 10 ft.
Spread	6 ft. to 10 ft.
Growth Pace	Moderate Grower
Light	Full Sun Only
Moisture	Adaptable
Maintenance	Low
Characteristics	Attracts Birds; Native
Bloom Time	Late Spring
Flower Color	White Flower
Uses	Beds and Borders, Screening
Style	Cottage Garden
Seasonal Interest	Spring Interest
Type	Shrubs

Taken from: www.finegardening.com

Green Ash

Green Ash *(Fraxinus pennsylvanica)*

General Description

A hardy, native, drought and alkali resistant medium to large tree. Since the onset of Dutch elm disease, Green Ash has been over-planted in urban and conservation settings as a replacement for American Elm. The largest tree in North Dakota is 69 feet tall with a canopy spread of 74 feet.

Leaves and Buds

Bud Arrangement - Opposite.

Bud Color - Terminal buds are scaly, dark rusty-brown, and somewhat woolly.

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

Leaf Type and Shape - Pinnate compound, 5 to 9 stalked leaflets.

Leaf Margins - Sharply-serrate to finely-toothed.

Leaf Surface - A few hairs along main veins below or occasionally pubescent below, glabrous or pubescent twigs and petioles.

Leaf Length - 10 to 12 inches; leaflets 3 to 4 inches.

Leaf Width - 5 to 7 inches; leaflets 1 to 2 inches.

Leaf Color - Bright green on both surfaces, sometimes paler below. Clear yellow fall color, with early leaf drop.

Flowers and Fruits

Flower Type - Dioecious, unisexual flowers are produced in large, dense clusters, hairy; anthers are linear-oblong, on short filaments.

Flower Color - Greenish-yellow.

Fruit Type - Samara, 1 to 2 inches long, with wing lanceolate and decurrent to below the middle of the seed.

Fruit Color - Light-brown to tan in color.

Form

Growth Habit - Variable.

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

Crown Height - 35 to 65 feet.

Crown Width - 30 to 40 feet.

Bark Color - Bark is ash-gray to brownish on older branches and furrowed into close diamond-shaped areas separated by narrow interlacing ridges.

Root System - Roots are shallow, fibrous, and wide spread.

Environmental Requirements

Soils

Soil Texture - Adapted to a wide variety of soil textures.

Soil pH - 6.0 to 8.0.

Windbreak Suitability Group - 1, 1K, 2, 2K, 3, 4, 4C, 5, 6D, 6G, 8, 9C, 9W, 9L.

Cold Hardiness

USDA Zone 2.

Water

Can withstand flooding for short periods of time, moderately-high drought tolerance.

Light

Full sun.

Uses

Conservation/Windbreaks

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

Wildlife

Seeds are eaten by birds and mammals. Trees provide cover and nesting sites for birds.

Agroforestry Products

Wood - A fine-grained wood suitable for furniture and athletic equipment (bats, handles, etc.).

Medicinal - Used as a diuretic and for sores and itches.

Urban/Recreational

Desirable for home shade and boulevard trees. Tolerates soil compaction.

Cultivated Varieties

Bergeson Ash (*Fraxinus pennsylvanica* 'Bergeson') - Patented, introduced by Bergeson Nursery, Fertile, Minnesota.

Cardan Ash (*F. pennsylvanica* 'Cardan') - A seed strain cultivar released by USDA-NRCS, Plant Materials Center, Bismarck, North Dakota and USDA, Northern Great Plains Research Lab, Mandan, North Dakota.

Dakota Centennial® Ash (*F. pennsylvanica* 'Wahpeton') - Fast growing, upright spreading male tree introduced by NDSU, Fargo, North Dakota.

Kindred Ash (*F. pennsylvanica* 'Kindred') - Introduced by the late Ben Gilbertson, Kindred, North Dakota. A male tree.

Marshall's Seedless Ash (*F. pennsylvanica* 'Marshall's Seedless') - Male, variable spreading to rounded tree.

Patmore Ash (*F. pennsylvanica* 'Patmore') - Introduced by Richard Patmore, Patmore Nursery, Brandon, Manitoba, Canada. A male tree.

Prairie Dome® Ash (*F. pennsylvanica* 'Leeds') - Densely oval to globose, male tree introduced by NDSU, Fargo, North Dakota.

Prairie Spire® Ash (*F. pennsylvanica* 'Rugby') - Dense, narrow upright male tree introduced by NDSU, Fargo, North Dakota.

Summit Ash (*F. pennsylvanica* 'Summit') - Fairly narrow, upright male tree introduced by Summit Nursery, Stillwater, Minnesota.

Related Species

Autumn Blaze White Ash (*Fraxinus americana* 'Autumn Blaze') - Released by Morden Research Station, Morden, Manitoba.

Black Ash (*F. nigra*)

Manchurian Ash (*F. mandshurica*)

Northern Blaze White Ash (*F. americana* 'Northern Blaze') - A new introduction from Jeffries Nursery, LTD, Portage la Prairie, Manitoba. Thicker twigs and hardier than 'Autumn Blaze'.

Pests

Common diseases include stem decay, branch and twig cankers, anthracnose, leaf rust and ash yellows. Common insect pests include cankerworms, ash borers and ash plant bugs.

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Plant Fact Sheet

GREEN ASH

Fraxinus pennsylvanicus Marsh.

Plant Symbol = FRPE

Contributed by: USDA NRCS New York State Office

Robert H. Mohlenbrock
USDA NRCS 1989
Midwestern Wetland Flora
@USDA NRCS PLANTS

Uses

Windbreak: Plant green ash in the central rows of multi-row windbreaks. It can also be used for single-row windbreaks, although loss of lower branches with age reduces effectiveness.

Wildlife: Green ash is of moderate importance to wildlife. The winged seeds (samaras) are eaten by a number of birds and mammals including wild turkey and rodents. Whitetail and mule deer browse the twigs and foliage.

Recreation and Beautification: Green ash is extensively planted as a shade and ornamental tree. New clones have increased its importance in the landscaping industry.

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

Fraxinus pennsylvanica Marsh., green ash, is a deciduous, medium-sized tree with an open, irregular crown reaching about 50 feet in height. Native to eastern North America and is fairly common west to Wyoming and Colorado along plains watercourses at elevations below 6,000 feet. The tree is fast growing on moist bottomlands, and is extremely hardy to climatic extremes once established.

Fruits are straw-colored, one-seeded, winged (samaras), 1 to 2 1/2 inches long, borne in dense branching clusters; flowers are inconspicuous, without petals, borne in dense clusters (panicles) near the ends of the twigs, male and female flowers on separate trees; leaves are opposite, pinnately compound, 4 to 6 inches long, 7 to 9 leaflets, narrowly elliptical, long-pointed, entire, bright green above, paler below; stem straight, bark thin with network of interlacing ridges, brown to dark gray, twigs smooth; roots are shallow, wide-spreading.

Adaptation and Distributoin

Green ash is widely adapted to soils, moisture conditions and pH found east of the Rocky Mountains. The species will tolerate seasonal flooding, but is intolerant of shading from surrounding trees. Green ash is a fairly early successional tree on most sites.

Green ash is distributed throughout the east and midwest of the United States. For a current distribution map, please consult the Plant Profile page for this species on the PLANTS Website.

Establishment

Green ash is comparatively easy to establish, and has been widely used for windbreaks in the plains and prairie states and provinces. The seedling will withstand weedy conditions, but at reduced growth rates.

Management

Green ash is not as rapid growing as red maple or elm, so it tends to be crowded out over time by its

faster growing cohorts. Management to retain green ash includes control of competition.

Deer will browse green ash seedlings so protective netting may be required where pressure is heavy.

Pests and Potential Problems
Green ash borer and carpenter worm can be a serious problem in this tree species. Rust and ashflower gall might cause concern in some years. Ash yellow is a disease that has been associated with sever growth reductions and/or dieback in areas of the eastern Great Plains.

Cultivars, Improved, and Selected Materials (and area of origin)
Green ash is a variable species and commonly accepted botanical varieties intergrade to some extent, especially *Fraxinus pennsylvanica* var. *subintegerrima* and *Fraxinus pennsylvanica* var. *lanceolata*. 'Cardan' (MT) is recommended for planting in the Northern Great Plains states. Green ash seedlings are available at most commercial hardwood nurseries.

Prepared By & Species Coordinator:
John Dickerson (Retired), USDA NRCS New York State Office, Syracuse, New York

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>

Green ash

Fraxinus pennsylvanica

Growth Form: irregular to elliptical
Crown Density: moderate
Size: 35-75 feet high
15-35 foot spread
Drought Resistance: excellent
Cold Hardiness: excellent
Growth Rate: rapid
Life Span: long
Elevational Range: to 6,000 feet
Soil Conditions: good alkaline tolerance
Possible Insect Problems: ash borer, oyster shell scale, ash sawfly
Possible Disease Problems: occasional powdery mildew
Wildlife Value: fair: game and songbirds
Seasonal Color: golden-yellow fall foliage
Miscellany: native; does best in sandy, loam soils

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

European Mountain-ash

European Mountain-ash *(Sorbus aucuparia)*

General Description
A small to medium-sized tree native to northern Europe and Asia. The most widely planted of all the mountain-ash species. This genus is in the Rose family and susceptible to fireblight. Sunscald may also be a problem on young trees. The largest tree in North Dakota is 36 feet tall with a canopy spread of 39 feet.

Leaves and Buds
Bud Arrangement - Alternate.

Bud Color - Terminal bud is woolly, purplish-brown.

Bud Size - 1/4 to 1/2 inch.

Leaf Type and Shape - Pinnate compound, 9 to 15 leaflets per leaf.

Leaf Margins - Serrate, usually entire on lower third.

Leaf Surface - Glabrescent above, glaucescent and pubescent beneath.

Leaf Length - 4 to 8 inches; leaflets 3/4 to 1¾ inches.

Leaf Width - 1 to 3 inches; leaflets 1/3 to 1/2 inch.

Leaf Color - Dull dark green; red fall color.

Flowers and Fruits
Flower Type - Borne in 3 to 5 inch diameter flat-topped corymbs.

Flower Color - Creamy-white.

Fruit Type - Small, berry-like pome, clustered.

Fruit Color - Bright orange-red.

Form
Growth Habit - Erect, forming an ovate or spherical canopy at maturity.

Texture - Fine, summer; medium, winter.

Crown Height - 20 to 30 feet.

Crown Width - 15 to 25 feet.

Bark Color - Young stems are pubescent, becoming glabrous with gray-brown to coppery-brown sheen when older.

Root System - Medium in depth and spread.

Environmental Requirements

Soils
Soil Texture - Prefers well-drained loams

Soil pH - 4.5 to 7.5. Does not tolerate salinity.

Windbreak Suitability Group - 1, 3.

Cold Hardiness
USDA Zone 3.

Water
Requires additional water during droughts. Does not withstand ponding or water-logged soils.

Light
Full sun.

Uses

Conservation/Windbreaks
Small tree for farmstead windbreaks in eastern half of state in protected areas.

Wildlife
Fruits may hang on well into the winter and on some plants appear to be more palatable to birds after they have been subjected to freezing and thawing.

Agroforestry Products
Wood - Furniture and tools.

Food - Fruit processed in jams or jellies, particularly in Europe.

Medicinal - Used for sore throats, coughs and diarrhea. Source of parasorbic acid, an antibiotic.

Urban/Recreational
Used as a boulevard, specimen, and shade tree in residential landscapes.

Cultivated Varieties
Black Hawk Mountain-ash (*Sorbus aucuparia* 'Black Hawk')

Cardinal Royal Mountain-ash (*S. aucuparia* 'Cardinal Royal')

Coles Columnar Mountain-ash (*S. aucuparia* 'Coles Columnar')

Cutleaf European Mountain-ash (*S. aucuparia* 'Asplenifolia')

Upright European Mountain-ash (*S. aucuparia* 'Fastigiata')

Wilson Mountain-ash (*S. aucuparia* 'Wilson') - Columnar form.

Yellowfruit Mountain-ash (*S. aucuparia* 'Xanthocarpa')

Related Species
American Mountain-ash (*Sorbus americana*) - Alkaline pH sensitive.

Showy Mountain-ash (*S. decora*) - Alkaline pH sensitive.

Pests
Disease pests include fireblight and canker. Insect pests include aphids and scales. Sunscald may occur on young, thin-barked trees.

Quaking Aspen

Quaking Aspen *(Populus tremuloides)*

General Description

Aspen trees grow fairly straight and become clear of lower limbs over time. Sometimes called Trembling Aspen because their leaves tremble in a light breeze due to their flattened petioles. Most extensive native range of any tree in North America. Rapidly recolonizes disturbed sites (after fire, logging, etc.). The largest tree in North Dakota is 70 feet tall with a canopy spread of 39 feet.

Leaves and Buds

Bud Arrangement - Alternate.

Bud Color - Reddish-brown.

Bud Size - Terminal buds are conical-shaped, pointed, lustrous, and 1/4 inch long.

Leaf Type and Shape - Simple leaves, cordate to broad-ovate.

Leaf Margins - Margins have small rounded teeth.

Leaf Surface - Glabrous.

Leaf Length - 1½ to 3 inches.

Leaf Width - 1¼ to 2 inches.

Leaf Color - Dark green above, dull green below. Fall color is golden-yellow.

Flowers and Fruits

Flower Type - Dioecious, staminate (male) and pistillate (female) flowers are on different trees. Flower is a catkin.

Flower Color - Greenish when immature, turning brown.

Fruit Type - Very small cottony seeds (average 3 million per pound). Seeds borne in a capsule.

Fruit Color - Pale green.

Form

Growth Habit - Trunk has little taper to the tip, rounded crown with brittle branches.

Texture - Medium, summer; medium, winter.

Crown Height - 25 to 60 feet.

Crown Width - 20 to 30 feet.

Bark Color - Varies from chalky white to olive-gray, and becomes rough furrowed on the lower trunk of mature trees.

Root System - Roots are abundant in the top 2 to 2½ feet of soil. Aspen usually regenerates from root suckers.

Environmental Requirements

Soils

Soil Texture - Prefers sands to loam but tolerates variable soil conditions.

Soil pH - 5.5 to 8.0.

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

Cold Hardiness

USDA Zone 1.

Water

Needs a moist site to do well. Primarily present in areas of high water table, north and east facing slopes, seeps and other moist areas.

Light

Full sun, will not tolerate shade.

Uses

Conservation/Windbreaks

Medium tree for farmstead windbreaks, and riparian plantings.

Wildlife

Heavily browsed by deer and other mammals as a winter food source. Grouse utilize large male buds for food.

Agroforestry Products

Wood - Primarily used for paper, pulpwood, boxes, crates, and pallets.

Food - Native Americans used the sap as food.

Medicinal - Used for fever, diuretic, eczemas and wormer. Contains salicin used as an anti-rheumatic drug, disinfectant, and antiseptic.

Urban/Recreational

Along ponds or streams, wetlands, and woody draws. Allowances must be made for extensive suckering.

Cultivated Varieties

None.

Related Species

Bigtooth Aspen (*Populus grandidentata*)

Columnar European Aspen (*P. tremula* 'Erecta')

Pests

Common diseases include Hypoxylon canker, Cytospora canker, and stem decay. Extracts of *Populus* species have toxic effects on insect pests.

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Plant Guide

QUAKING ASPEN
Populus tremuloides Michx.
Plant Symbol = POTR5

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

Brother Alfred Brousseau
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Alternate Names
Trembling aspen, golden aspen, mountain aspen, trembling poplar, white poplar, popple; aspen

Uses
Industry: Quaking aspen is an important fiber source, especially for pulp, flake-board, and other composite products. The wood is light and soft with little shrinkage (see Wheeler 2000) and is used for pallets, boxes, veneer, and plywood. Higher grades are used for other solid wood products, such as paneling, furniture components, and flooring. The wood characteristics make it useful in miscellaneous products, including excelsior, animal bedding, matchsticks, toys, beehives, tongue depressors, spoons, and ice cream sticks. It makes good playground structures because the surface does not splinter, although the wood warps and susceptible to decay.

Conservation: Quaking aspen is valued for its white bark and brilliant fall color, especially when clustered. The species been widely used in landscaping but is best in sites away from structures that might be damaged by the aggressive roots. The trees provide good visual screening and noise abatement.

Aspen stands are good firebreaks, often dropping crown fires in conifer stands to the ground when they reach aspens and even sometimes extinguishing the fire because of the small amount of flammable accumulation. They allow more ground water recharge than do conifer forests and they also play a significant role in protecting against soil erosion. They have been used in restoration of riparian habitats.

Wildlife: Young quaking aspen provides food and habitat for a variety of wildlife: black bear, deer, beaver, porcupine, elk, moose, ruffed grouse and many smaller birds and animals, including small mammals such as mice, voles, shrews, chipmunks, and rabbits. Bark, buds, new sprouts, twigs from the tops of fallen or logged trees, and fallen leaves all are wildlife foods.

Ethnobotanic: Native Americans used *Populus* bark (including aspen) as a food source. They cut the inner bark into strips, dried and ground it into meal to be mixed with other starches for bread or mush. Catkins were eaten raw, and the cambium was eaten raw or in a soup.

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: Willow Family (Salicaceae): This is a native tree 5-30 m high, typically less than 15 m, with a rounded crown; lateral roots may extend over 30 meters and vertical sinker roots from the laterals may extend downward for nearly 3 m; bark typically smooth, greenish-white to gray-white, often thin and peeling, becoming thicker and furrowed with age, especially toward the base. Leaves simple, deciduous, broadly ovate to nearly round, 4–6 cm long, with small, rounded teeth on the margins, on a

slender, flattened petiole, dark green and shiny above, pale green below, turning bright yellow, yellow-orange, gold, or reddish after the first frosts. The male (staminate) and female (pistillate) flowers are on separate trees (the species dioecious – or 'polygamodioecious,' because bisexual flowers may be produced at low frequencies on staminate and pistillate trees), each type of flower borne in pendent catkins. The fruits are narrowly ovoid to flask-shaped capsules 5-7 mm long, splitting to release the seeds; seeds ca.2 mm long, each with a tuft of long, white, silky hairs, easily blown by the wind. The common name is in reference to the shaking of the leaves in light wind.

Variation within the species: Considerable genetic and morphological variation exists over the range of quaking aspen. A number of species and varieties have been described but none are currently recognized. Entire stands are often produced as a single clone from root sprouts – this sometimes easily observable on a single mountainside in different timing in leaf appearance or in different hues and timing of fall coloration. Distinctively large triploid trees are sometimes found.

Quaking aspen hybridizes naturally with bigtooth aspen (*Populus grandidentata*), narrowleaf cottonwood (*P. angustifolia*), curly poplar (*P. canescens*), balsam poplar (*P. balsamifera*), eastern cottonwood (*P. deltoides*), and white poplar (*Populus alba*, a naturalized European species), and hybrids with black cottonwood (*P. trichocarpa*) occur rarely in Alaska. Quaking aspen, bigtooth aspen, European aspen (*P. tremula*), and three Asian species are closely related and sometimes classed together as a single, circumglobal superspecies (see Peterson and Peterson 1992).

Distribution
Quaking aspen is the most widely distributed tree species in North America. It grows from Alaska across the Northwest Territories to Quebec and Newfoundland, south to West Virginia and Virginia, and in all of the western North America US states (except Oklahoma and Kansas) -- in all Canadian provinces and all but 13 US states (absent from the Southeast). It occurs in both the eastern and western sierras of Mexico, into the south-central part of the country. Outside of the main range, it is represented by a huge number of disjunct populations. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Adaptation
Quaking aspen occurs in a wide variety of habitats (including soil type and moisture conditions) and at a great range of elevation, matching its extensive geographic range. It characteristically forms pure stands or mixed stands with bigtooth aspen, but it occurs with scrub oaks and sagebrush at lower elevations and as a prostrate form above timberline and exists as a dominant species in many communities at mid elevations. It is a shade-intolerant, disturbed site species and is quickly replaced in succession by more tolerant species.

Some trees are self-pruning, dropping numerous small twigs with excess fall foliage and returning nutrients to the soil. Leaves decay relatively rapidly, and a characteristic "aspen soil," with a higher pH than on conifer-dominated soils, develops on sites that have supported aspen for a number of generations.

Flowering occurs March–April (East) or May–June (West), before the leaves appear and fruiting in May–June (–July), often before the leaves are fully expanded. Temperatures above 12° C for about 6 days apparently trigger flowering. Female trees generally flower and leaf out before male trees.

Establishment
Quaking aspen commonly establishes from seed in Alaska, northern Canada, and eastern North America. Seedling establishment is less common in the West but occurs there in moist sites such as kettles and other topographic depressions, seeps, springs, lake margins, and burnt-out riparian zones. Drought stress kills seedlings, as does standing water.

Young trees first flower at 2-3 years but production of large seed crops begins at about 10-20 years; maximum seed production occurs at 50-70 years. Heavy seed crops are produced at 4-5-year intervals. Seeds are wind-dispersed for distances of 500 meters to several kilometers.

Germination generally begins nearly immediately after moisture is received and can occur across a broad temperature range, with optimal germination at 15-25° C. Surface placement or a very shallow depth of burial on exposed mineral soil (such as burned or scarified sites) apparently provide the best environment for germination. Continuous moisture is required.

Asexual reproduction and clones
Reproduction of quaking aspen is primarily by root sprouts, and extensive clones of root-interconnected

trees are characteristic of the species. Most root sprouts develop within 10 meters of the parent stem, although some are produced at 30 meters or more. They develop from roots within 2-10 centimeters of the surface. Growth in primordia and buds is suppressed by apical dominance but resumes after stems are top-killed by fire, harvest or wind-breakage, or after defoliation and many thousands of sprouts per acre may be produced. Removal of the above-ground plant portion in June or July after maximum auxin production (the chemical agent of apical dominance) results in fewer suckers than top-removal during the dormant season. Sprouts produced in a closed stand usually die unless in a canopy gap. Saplings may begin producing root sprouts at 1 year of age.

Stands of quaking aspen may consist of a single clone or represent a mosaic of different clones. Even in a small area, wide variation in genetic traits exists between clones – differences may be seen in leaf shape and size, bark colour and texture, branching habit, resistance to disease and insect attack, sexual expression, growth rate, and phenology. The most conspicuous differences may be in the timing of spring leaf flush and in autumn leaf coloration.

The staminate-pistillate ratio of clones is 1:1 in most localities, but in the eastern US staminate trees may outnumber pistillate ones by 3:1. Some clones alternate between staminate and pistillate forms in different years or produce combinations of perfect, staminate, and pistillate flowers.

Individual trees of quaking aspen are short-lived (maximum age in the Great Lakes states is 50–60 years, up to 150 years in the West). Stands may be even-aged (after a single top-kill event) or only broadly even-aged (from sprouting of a gradually deteriorating stand). The clones are much older: many in the Rocky Mountain and Great Basin regions are at least 8000 years old, persisting since the last glacial retreat. A male clone in the Wasatch Mountains of Utah occupies 17.2 acres (43 ha) and has more than 47,000 stems – this clone is estimated to be 1 million years old and may be the world's most massive known organism. Clones east of the Rocky Mountains usually cover no more than a few acres.

Management

The thin, soft bark of quaking aspen makes it susceptible to many diseases and insect infestations as well as mechanical and fire damage. Fires may kill trees or cause basal scars that serve as entry points for wood-rotting fungi, which are common in older stands. The wood decays easily. Fires may also kill surface roots that could reduce sucker regeneration.

The poplar borer beetle, one of the most common wood borers of aspen, weakens trees by boring galleries in the trunk near the lower portion of the crown. Outbreaks of forest tent caterpillar may last 4-5 years and result in serious defoliation -- cold weather in the spring shortly after the eggs hatch and above-average fall temperatures can cause a rapid decline in caterpillar populations by killing eggs and larvae. Overgrazing by livestock or big-game animals disturbs roots and compacts soil, limiting sucker formation. Heavy grazing of young sucker stands by cattle for three years in a row may destroy them.

Quaking aspen can be propagated by seed, following cold stratification. Germination of fresh seed may be 80-95%, but viability lasts only 2-4 weeks under favorable natural conditions (low temperature and humidity). Seeds dried for 3 days and stored at cool temperatures may retain good viability for up to a year.

The species roots poorly from woody stem cuttings, but newly initiated (softwood) shoots can usually be induced to root by dipping in IBA (indolebutyric acid) or other commercially available rooting powders. A more preferred method uses root sprouts. Collect dormant lateral roots in early spring -- plant root cuttings 1-2 in diameter and 3-5 centimeters long in vermiculite and place in the greenhouse for 6 weeks. Excise the young sucker shoots and root in perlite/vermiculite (2-3 weeks, using IBA), misting frequently. Transplant the developing plants to peat/vermiculite mix and grow at 15-25º C. Or, the root cuttings may be planted directly into the perlite mix, with the top of the cutting just below the media surface.

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

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.”

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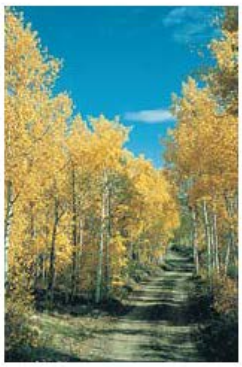
For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site<http://plants.usda.gov> or the Plant Materials Program Web site <http://Plant-Materials.nrcs.usda.gov>

Aspen

Populus tremuloides

Growth Form: ovoid to columnar
Crown Density: open
Size: 35-50 feet high
20-35 foot spread
Drought Resistance: poor
Cold Hardiness: excellent
Growth Rate: rapid
Life Span: moderate
Elevational Range: to 11,000 feet
Possible Insect Problems: poplar borer, scale, tent caterpillar, twig gall fly
Possible Disease Problems: cytospora canker, leaf spot
Wildlife Value: high: buds and catkins for food value for grouse and browsers
Seasonal Color: yellow fall color
Miscellany: native



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