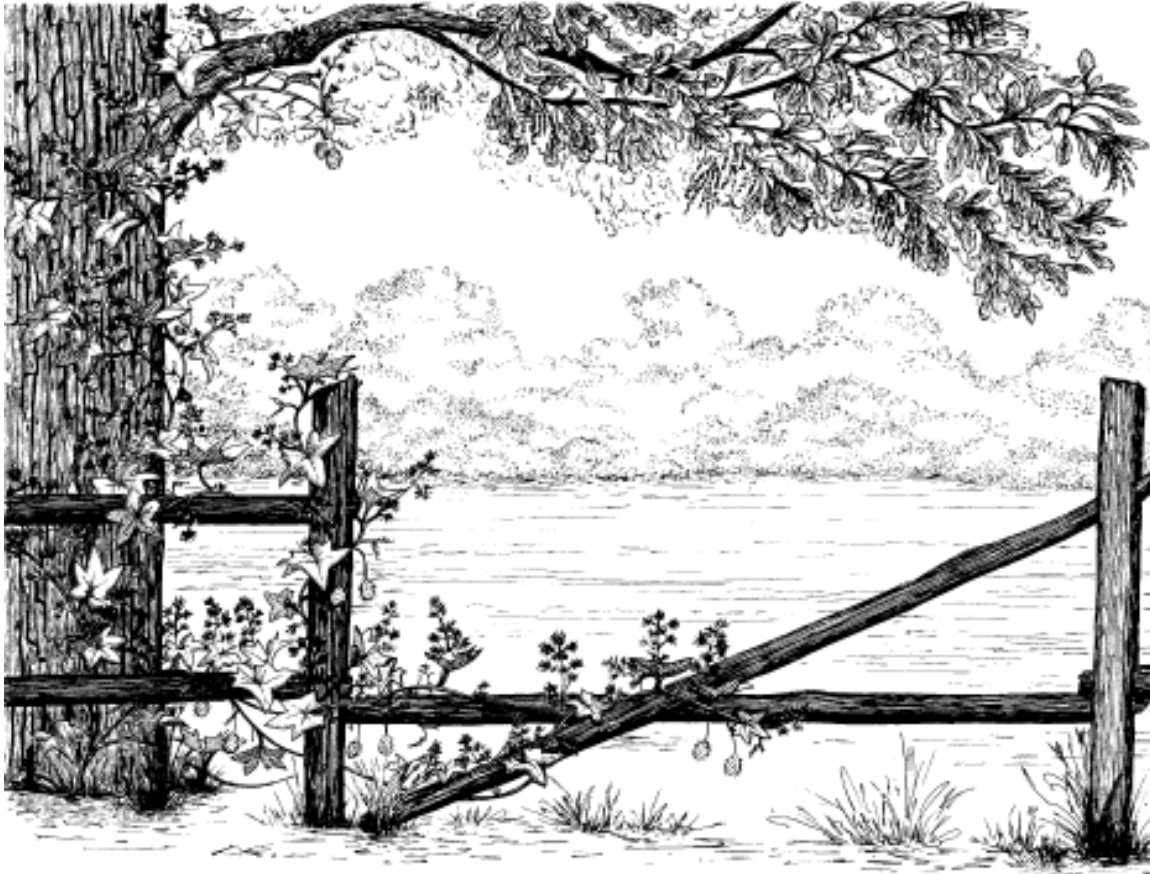


# Gymnosperms

Revised May the 4<sup>th</sup> 2015



“The folk taxonomy of conifers in our area is an interesting, though tangled, story. The town of Spruce Pine, NC is apparently named for *Tsuga canadensis*. Spruce Pinnacle in Buncombe Co, NC is crowned with old *Tsuga caroliniana*. *Picea rubens* & *Abies fraseri* are called "He Balsam" & "She Balsam" (considered the male & female of a single species). Tamarack Post Office in Watauga Co, NC & Tamarack Ridge in Highland Co, VA are named for the abundance of *Picea rubens*! The generally used common name for *Juniperus* is "CEDAR," & *Chamaecyparis* is called "JUNIPER." (Alan S Weakley, Flora of the Southern & Mid-Atlantic States, Working Draft of 8 March 2010)

## GYMNOSPERMS

CUPRESSACEAE

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PINACEAE

TAXACEAE

GINKGOACEAE

## ACROGYMNOSPERMAE (EXTANT GYMNOSPERMS)

**Gymnosperm** noun (from Modern Latin *gymnospermus*, from Greek γυμνόσπερμος, *gymnospermos*, from γυμνός, *gymnos*, naked, & σπέρμα, *sperma*, seed) Seed-bearing plant in which the ovules are borne on open scales. “A plant which has naked seeds, as the pine, hemlock, fir, etc.; one of the *Gymnospermae*, a class of exogenous plants so characterized, embracing the orders *Cycadaceae*, *Coniferae*, & *Gnetaceae*” (oed). Inhomogenous group of seed plants bearing their ovules on open megasporophylls (or ovuliferous scales in confers) & not in closed megasporophylls (=carpels) like angiosperms. Gymnosperms comprise three distantly related groups: conifers (8 families, 69 genera, 630 species) cycads (3 families, 11 genera, 292 species) & *Gnetales* (3 families, 3 genera, & 95 species) (sk08).

*Gymnospermae* (Greek *gymnos*, uncovered, naked, & Greek σπέρμα, *sperma*, seed) An important division of the plant kingdom, being woody plants with alternation of generations, having the gametophyte retained on the sporophyte & seeds produced on the surface of the sporophylls & not enclosed in an ovary.

Originated in Late Carboniferous (Pennsylvanian) period, but since the Cretaceous (146-65 mybp) gymnosperms have been mostly displaced by the more successful angiosperms. About 700-900 (850) living species, 16 (6-8) families, 65-70 (82, 86) genera, & 600-630 (850, 974) species. Most are woody, needle-leaved, & evergreen, others have flat, triangular scale-like leaves, or broad, flat, strap-like leaves, & *Ginkgo* is a deciduous broadleaf. In eastern North America, gymnosperms are largely represented by the numerous conifers, the Pine, Yew, & Cypress families.

Some of the oldest, tallest, largest, & thickest living (non-cloning) things on earth are BRISTLECONE PINES (4,700 years old), COAST REDWOOD (370' tall), GIANT SEQUOIA (50,205 cu ft largest), & MONTEZUMA CYPRESS (37.5' thick).

The *Pinaceae* have ectomycorrhizal mycorrhizae (ECM). The other gymnosperms generally have vesicular-arbuscular mycorrhizae (AM), with *Juniperus* occasionally ECM. (Brundrett 2002)

### C is for Conifers

Most with cones for seeds  
Most with needles for leaves  
C is for conifers  
My kind of trees

Larch, junipers & fir  
Spruce, cedars, & pines  
C is for conifers  
More than five hundred kinds

If you see a Christmas tree  
Or a stack of newspapers  
Or a two-by-four frame of a house  
It's probably made from pine trees  
& pine trees are conifers  
That's what this song is about

Or if you see a plant  
In the shape of an elephant  
Or in the shape of a dog  
It's probably a shrub  
A conifer shrub  
Pruned into that shape by someone

Most with cones for seeds

Most with needles for leaves  
C is for conifers  
My kind of trees

Larch, junipers & fir  
Spruce, cedars, & pines  
C is for conifers  
More than five hundred kinds

There are so many different kinds of conifer trees. This is just a few of them:

Spruce  
Hemlocks  
Larch  
Cyprus  
Juniper  
Fir  
Douglas fir  
Cedar  
Yew  
Pine  
The dwarf conifer  
& the great California sequoia redwood

Most with cones for seeds  
Most with needles for leaves  
C is for conifers  
My kind of trees

Larch, junipers & fir  
Spruce, cedars & pines  
C is for conifers  
More than five hundred kinds  
They Might Be Giants 2005

#### **CUPRESSACEAE** Bartlett 1830 **CYPRESS FAMILY**

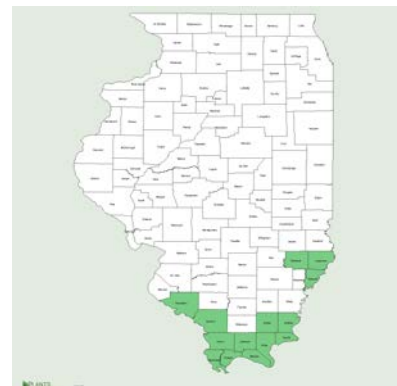
A family of about 29 genera & 130 species. Various treatments place *Taxodium* in the *Taxodiaceae*. “Recent studies indicate that the separation of the *Taxodiaceae* from the *Cupressaceae* is not warranted, & they are here combined (Gadek et al 2000, Brunsfeld et al 1994)” (w12). Newer treatments place *Juniperus* in this family (m14). *Chamaecyparis* WHITE CEDAR selections are popular in landscaping, & some are hardy on northwest Illinois sandhills.

The fruit of a cypress or juniper is called a *galbulus* (oed).

**TAXODIUM** LC Richard 1810 **BALD CYPRESS** *Cupressaceae* *Taxodium* (taks-O-dee-um) from Latin *Taxus*, generic name of the yew & Greek *-oides*, *-iodos*, a resemblance, like. A genus of 3 (2) species of deciduous conifers of eastern North America & Mexico. Some authors place this in *Taxodiaceae* (M14).

***Taxodium distichum*** (Linnaeus) Rich. **BALD CYPRESS**, aka *CIPRESSO DELLE PALLUDI*, GULF CYPRESS, SOUTHERN CYPRESS, SWAMP CYPRESS, (*distichus -a -um* (DIS-ti-kus) in two ranks or two rows, having two rows for the leaves.)

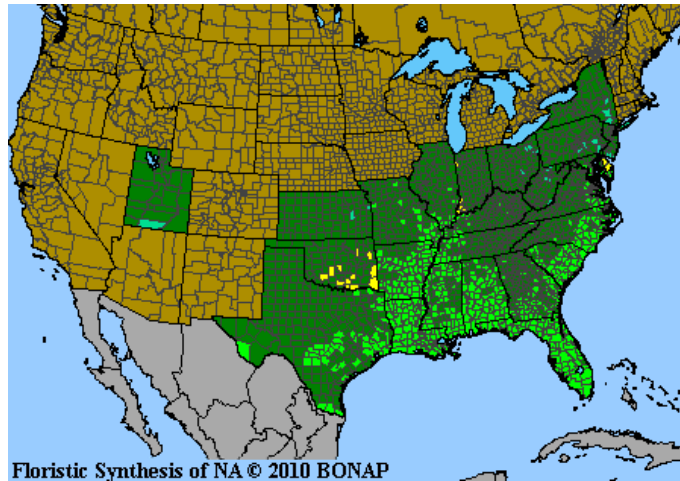
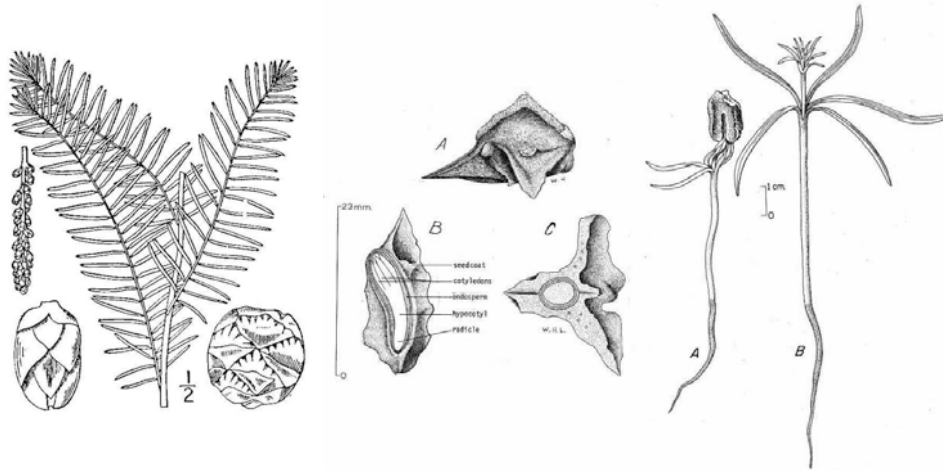
Habitat: Swamps, low wet woods, standing water. distribution/range: Swamps; s Illinois, extending n along the Wabash River to Lawrence & Richland cos; planted elsewhere (m14). Often planted far north of its range. This species was part of the original tree plantings on Interstate 80 in north central & northwest Illinois, & many have survived. WIU has a



colony on the LaMoine River north of campus that was well established in the 1970's. Species has survived well for 35 years in the back yards & the Old Channel of Green River in New Bedford, (aka Tail-holt), Bureau Co.

Description: Large tree to 100'. 5008 (jfn04) seeds per pound.

Associates: Waterfowl eat seeds.

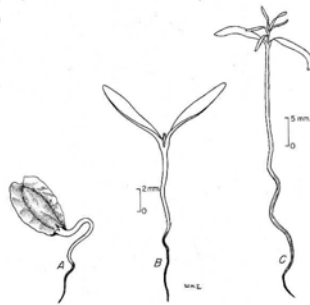


*Taxodium distichum*

First line drawing courtesy of Kentucky Native Plant Society. Second line drawing W.H.L. @ USDA-NRCS PLANTS Database. Third line drawing courtesy of the US Forest Service USDA-NRCS PLANTS Database. Seed photo Steve Hurst - USDA-NRCS PLANTS Database - Not copyrighted image. Illinois map courtesy plants.usda.gov. North America map courtesy of BONAP (2010)

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**THUJA** Linnaeus 1753 **ARBORVITAE, CEDAR** *Cupressaceae* (THOO-ya) from the Greek name of a juniper. A genus of 5 species of evergreen conifers, native to eastern North America, western north America, & eastern Asia.



Seedling line drawing WHL @ USDA-NRCS PLANTS Database.

**Thuja occidentalis** Linnaeus **ARBORVITAE**, aka **AMERICAN ARBORVITAE, CÉDRE BLANC, CÉDRE-THUYA OCCIDENTAL**, **EASTERN ARBORVITAE, EASTERN WHITE CEDAR, FLAT CEDAR, LEBENSBAUM, NORTHERN WHITE CEDAR, SWAMP CEDAR, THUIER CÉDRE, WESTERN WHITE CEDAR, WHITE CEDAR, Gi'jikan'dug**, cedar-like (Ojibwa) ((ok-kiden-TAH-lis) of the west from Latin *occidens, occidentis*, noun, the west, the setting sun, & -*alis*, adjective suffix of or pertaining to, as opposed to *T orientalis* Linnaeus of China, now known as *Platycladus orientalis* (Linnaeus) Franco)

Habitat: Swamps & cool rocky banks, cliffs, bluffs, & bogs.

distribution/range:

Culture: Best planted outdoors in the fall (pm09).

Rooted cuttings.

Needs high soil moisture & medium fertility (apparently not when it grows on rocky ledges). Optimum pH 6.9. Hardy to zone 2. Many established, cultivated specimens in northwest Illinois died in the drought of 2012.

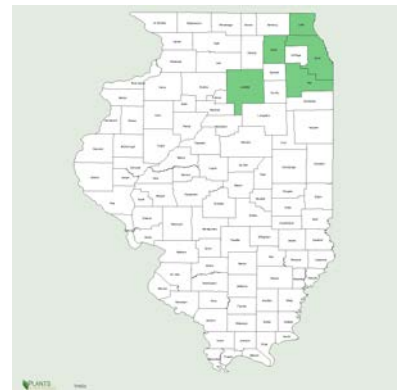
Description: Medium tall, dense, evergreen, native tree, 40-60'; bark red-gray-brown. key features: "Scale-like leaves, female cones are oblong-ovoid & 0.33-0.5 in. long (1 cm); pale shredding bark." (Ilpin)

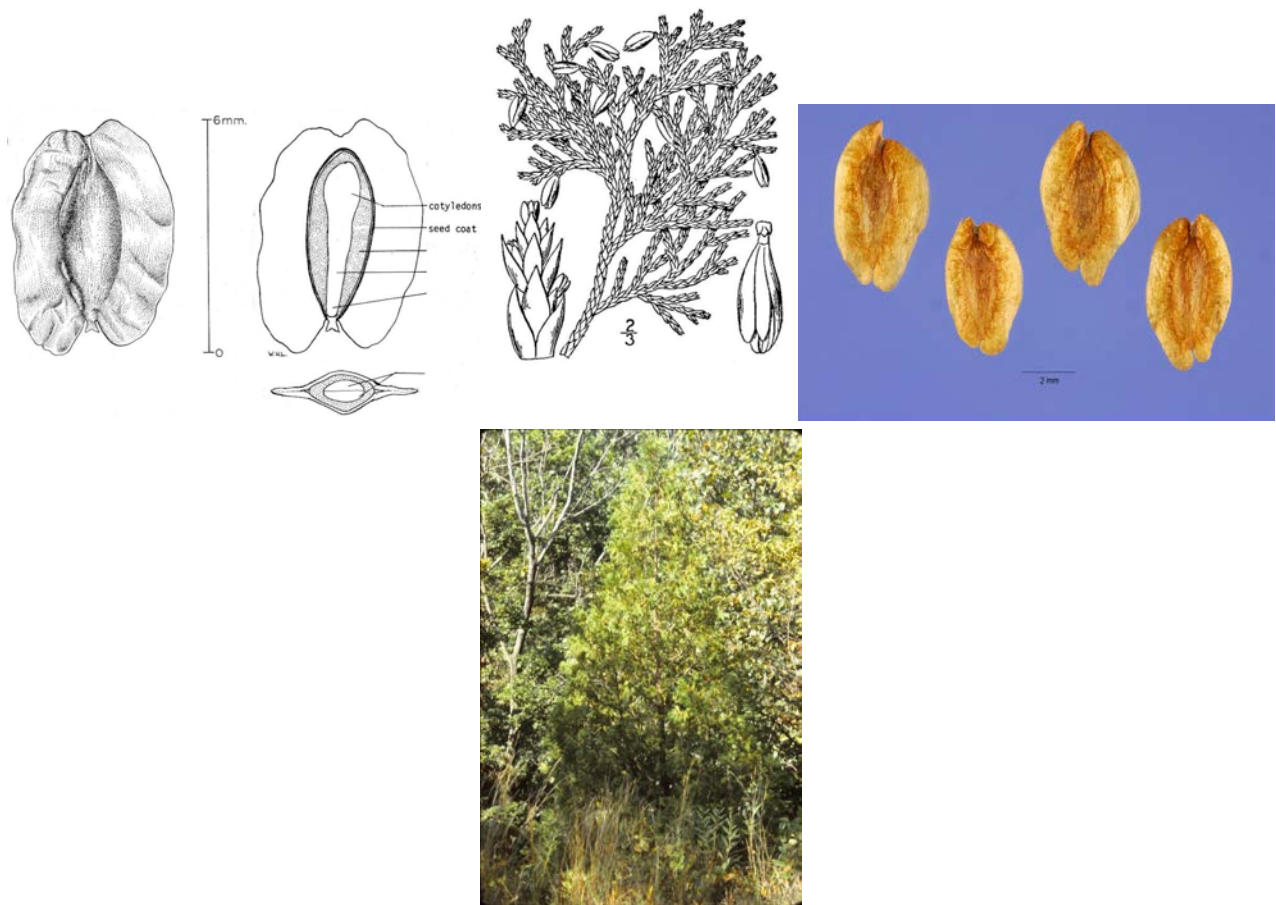
Comments: status: phenology: C3. Known from sandstone bluffs north of LaSalle, & near Ottawa & Ogelsby.

Associates: Winter cover & food for many animals, including pine siskin & deer. Deer & rabbits may damage landscape plantings.

ethnobotany: This & paper birch are the two most useful trees for Ojibwa (sm32). Bark gathered in June & early July. Used as medicinal beverage by Ojibwa & Pottawatomie (sm32, 33). Ojibwa also used it for dye, food, & as ceremonial incense. Ojibwa & Menominee utility plant. Ojibwa medicine for coughs, extract of young twigs recommended as febrifuge, expectorant, & anthelmintic (den28). Used as dye by Ojibwa (Stowe 1940). Wood used for canoe ribs, toboggans, sturgeon spear handles, roots used to sew canoes, & bark used for rope, twine, nets, bags, & mats by Ojibwa (Gilmore 1933, sm32, den28); used for bags by Menominee (sm23); used for mats by Ojibwa & Ottawa (Jones 1948, Douglas 1941)

VHFS: Numerous cultivars are readily available.





*Thuja occidentalis*, sandstone bluff, Tomahawk Creek, LaSalle Co

First Line drawing W.H.L. @ USDA-NRCS PLANTS Database. 2<sup>nd</sup> line drawing courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst - USDA-NRCS PLANTS Database - Not copyrighted image. Illinois map courtesy plants.usda.gov.

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## **PINACEAE** Lindley 1836 **PINE FAMILY**

Remember:

Fir flat needles (usually) & friendly (to the touch, usually, but Spanish Fir is sharp pointed)

Spruce sharp, square (needles in cross-section)

Pine in packages (needles in groups of 2, 3, 5, rarely 1)

**ABIES** P Miller 1754 **FIR TREE** *Pinaceae* PINE FAMILY (A-bee-ayz) New Latin, from classical Latin name for silver fir. A genus of 40-50 (42) evergreen trees north temperate south to Central America that are the true firs distinguished from spruces by flattish leaves, smooth circular leaf scars, & erect cones. Natives & non-natives are grown as ornamentals. *A concolor* was Jock Ingels' favorite Christmas tree. x = 12.

Seeds ripen in the fall. Harvest cones as they turn from purple or green to brown. Cullina code B seeds will germinate upon shifting to 70°F after 90 days of cold moist stratification at 40°F. Fall sowing outdoors with best germination in cool temperatures of spring. The initial whorl of 4-7 cotyledons may be the only 1<sup>st</sup> year growth. (cu02)

**Abies balsamea** (Linnaeus) Mill. BALSAM FIR, aka BALM OF GILEAD FIR, CANADA BALSAM, FIRPINE, SAPIN, SILVER FIR, SILVER PINE, *A'ninandak'* (Ojibwa) (bal-SAM-ee-a; *balsamea*, aromatic, balsam like, from *balsameus*, balsam-like, for the bark.)

Habitat: Moist woods & swamps. Cool, moist, rich soil & low swampy ground in the south & on well-drained hillsides in the north. distribution/range: Indiana, Michigan, Wisconsin, Minnesota, & Iowa.

Cuttings are difficult. Cultivars are typically side-grafted, with *A balsamea* as the preferred understock. (cu02).

Optimum pH 5.2. Shade tolerant. Dry or moist soils.

Description: Steeple-shaped, needle-leaved, evergreen, native tree, 40-80'; stems minutely hairy; needles are single, flat, whitish-below, 0.18-0.25" long; 1.75-3.25" long cones.

Comments: Provides winter cover. Used by spruce grouse, porcupine, deer, & moose.

Associates: ethnobotany: Used as medicinal beverage by Menominee (sm23, 33) Ojibwa, & Pottawatomie for medicine (sm32, 33). Ojibwa headache medicine (den28). Resin used for salve & taken internally for colds, coughs, & asthma. Piece of root held in mouth for mouth sores. Pitch used for sealing canoes by Ojibwa (sm32). Needles smudged in sweat lodges to clear congestion. Historic Christmas tree. Canada balsam, liquid oleoresin is stimulant, diuretic, occasionally diaphoretic, & externally rubefacient. Tea of inner bark used for chest pains, twig tea used for laxative. The soft perishable wood is used for crates, boxes, & paper pulp. The resin is a source of turpentine & adhesive for microscope slides & optical lenses. Wood soft, light, coarse grained, used for crating, food containers, & pulpwood. The source for Canada turpentine, or Balsam of fir, Balm of Gilead. Used medicinally in catarrhal diseases of urogenital tracts, externally for plasters.

VHFS: [*Pinus balsamea* L.]



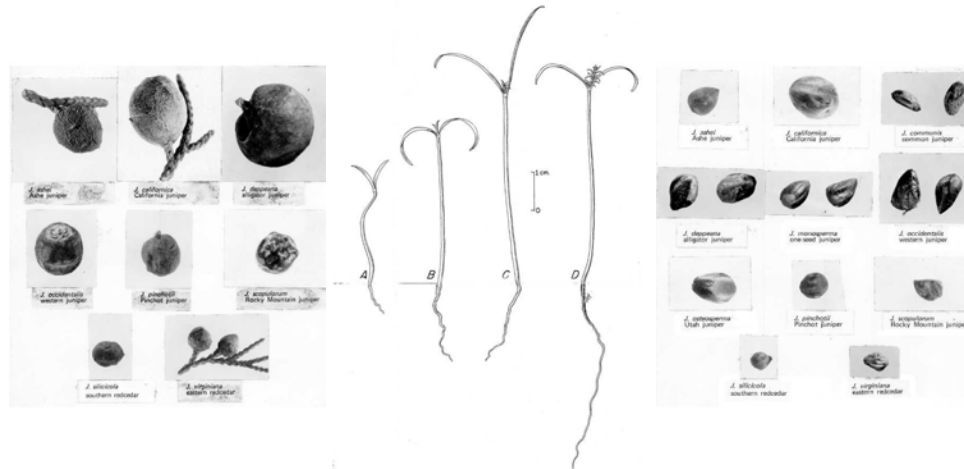
### *Abies balsamea*

Line drawing courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Second line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Cone photo courtesy of USDA Forest Service USDA-NRCS PLANTS Database

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**JUNIPERUS** Linnaeus 1753 **JUNIPER, CEDAR, REDCEDAR, CEDRO, SABINO, SAVIN** *Pinaceae Juniperus* (yoo-NI-pe-rus) New Latin, from the classical Latin name, *iuniperus*, the name for juniper, derivation unclear, Celtic perhaps. Possible Latin contraction of *iuveni-parus*, (too) young (early) bearing, a reference to the habit

of *Juniperus sabina*. Possible root in *iuncus*, rush or reed, for the twigs use in weaving. Some feel it may relate to *Iupiter*, genitive *Iovis*, hinting at the plants use in religious ceremonies. A large genus, 60 species of coniferous evergreen shrubs or trees primarily of the Northern Hemisphere, 13 in North America, having small appressed scale leaves or especially on juvenile growth acerose (acerate) leaves, minute solitary terminal flowers, with small cones resembling berries, including some cultivated as ornamentals & some valued for their timber. Cones are mostly terminal, but are axillary in *J communis*. The cones of *J communis* are used as a spice & to flavor gin. *Genever* (Dutch) was originally made by distilling fermented juniper berries, eventually giving rise to the grain-based, juniper-flavored, distilled beverage gin. x = 11. Placed by some in *Cupressaceae*, or Cypress Family.



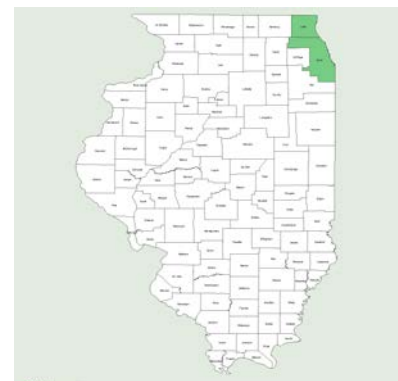
Photos courtesy of USDA Forest Service USDA-NRCS PLANTS Database



JUNIPERS in the landscape, John Deere, Silvis, Illinois, design by Chub Harper, note *Buchloë* turf.

**Juniperus communis** Linnaeus \*IL, IN, KY, MD, OH COMMON JUNIPER, aka GROUND JUNIPER, MOUNTAIN JUNIPER, *Ga'gawan'dagsid*, deceptive (Ojibwa) (*communis -is -e* common, universal, general; growing in a society or community, for its colonial habit) Section *Juniperus*.

Habitat: Poor rocky soil & pastures. “Rocky soil, slopes, & summits” (R. P. Adams fna). In the se USA, “In thin soil around rock outcrops on mountain summits & Piedmont monadnocks & rocky bluffs (in GA & NC), high elevation old fields (in VA), xeric Coastal Plain sandhills (in SC & VA)” (w12) distribution/range: Very rare in Illinois, Cook & Lake cos. Northeast Illinois is at the southern limit of this species Midwest range, although it





occurs further south in the Rocky Mountains & further south in the east, primarily in the Appalachian & Blue Ridge Mountains.

Culture: Rooted cuttings. Growth rate slow. Seedling vigor low. Vegetative spread rate none?????. Spreads slowly from seed.

cultivation: Tolerant of coarse, medium, & fine textured soils. Anaerobic tolerance none. CaCO<sub>3</sub> tolerance high. Drought tolerance high. Fertility requirement low. Salinity tolerance none. Shade intolerant. pH 5.5-8.0.

Description: Shrubs to 4 meters, small trees to 10 meters; minimum root depth; bark; all leaves subulate, borne in whorls of 3; fruits fleshy cones maturing 2<sup>nd</sup> or 3<sup>rd</sup> year; N 2n = 22.

For variety *communis*: “Sand dunes, rare; Lake Co” (m14). “Erect shrub or small tree with a well-developed central axis; leaves spreading; cone, berry- or drupe-like, bluish or black.” (Ilpin)

Comments: status: Threatened in Illinois. Rare in Indiana. Threatened in Kentucky. Endangered & extirpated in Maryland. Endangered in Ohio. phenology: Blooms March - April. Fleshy cones or “berries” mature second or third year. 40,363 (usda) seeds per pound

Associates: Wind pollinated. Seeds are dispersed by birds. Provides food & cover for upland birds.

ethnobotany: Used as medicinal plant by Ojibwa & Pottawatomie (sm33, Gilmore 1933). Bark used for weaving mats & house building by Ojibwa (Reagan 1928). Ojibwa utility plant (den28).

The berry, aka THE SPIRIT OF GIN, provides the piney flavor of gin. (*Gin was ‘discovered’ during an attempt to improve the medicinal value of JUNIPER.*) The berries are used in seasoning food. I strongly recommend pheasant with juniper sauce at Pheasant Run in St. Charles. The sauce is often served with pork, venison, elk, & upland game birds. The berries are also used in seasoning *Sauerbraten*.

VHFS: There are 5 (3-4) varieties in North America & two in Eurasia. This is the most widespread species of JUNIPER, with controversial subspecies &/or varieties or formas.

[*Juniperus canadensis* Lodd ex Burgsd, *J communis* subsp *depressa* (Pursh) Franco, *J depressa* (Pursh) Raf]



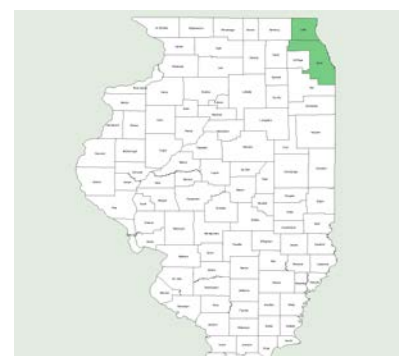
*Juniperus communis*

Line drawing courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Illinois map courtesy plants.usda.gov.

**Juniperus communis** Linnaeus var **depressa** Pursh GROUND JUNIPER, aka MOUNTAIN JUNIPER, COMMON JUNIPER.

Habitat: “In thin soil around rock outcrops on mountain summits & Piedmont monadnocks & rocky bluffs (in GA & NC), high elevation oldfields (in VA), xeric Coastal Plain sandhills (in SC & VA)” (w12).

distribution/range: “Sand dunes, rare; Cook & Lake cos; adventive in DuPage Co” (m14).



Fleshy cone maturing in the second or third year. “Cone berry- or drupe-like, bluish or black; decumbent but not prostrate, forming flat-topped circular patches; leaves with a median white strip above, spreading or ascending.” (Ilpin) “

The berry is used as a spice & the flavoring of gin.

Variety *depressa* Pursh, OLDFIELD JUNIPER, wide growing, very prickly, bright green summer color & bronze winter color. 3-4' tall and 10-20' wide, use in dry native plantings, hardy to zone 2. A decumbent shrub, to about 1 meter, forming large clonal patches. Other sources state variety *depressa* may form columnar trees to 10 meters (Adams fna 1993).

Var. *depressa* cultivar “Petite” Low spreader only 1' tall. Nice blue fruit display. Bright green summer color & bronze winter color, sprawls nicely over rocks & walls, good bark character on older specimens. Selected by Prof ER Hasselkus, University of Wisconsin-Madison. Hardy to zone 2.

**Juniperus horizontalis** Moench \*IL, IA, NH, NY, VT CREEPING JUNIPER, aka TRAILING JUNIPER, PROSTRATE JUNIPER, (*horizontalis -is -e* (ho-ri-zon-TAH-lis) horizontal, for the prostrate habit.)

Habitat: Dry, sandy soils. distribution/range: “Sand dunes, very rare in Illinois, Cook & Lake cos” (m14). Northeast Illinois is at the southern limit of this species range.

Culture: Growth rate rapid. Seedling vigor unknown. Vegetative spread rate slow.

cultivation: Tolerant of coarse, medium, & fine textured soils.

Anaerobic tolerance none. CaCO<sub>3</sub> tolerance low. Drought tolerance low. Fertility requirement low. Salinity tolerance none. Shade intolerant. pH 4.8-7.5

Description: Native, prostrate, matt-forming, evergreen shrub; minimum root depth; bark; leaves scaly, some small needles in whorls of three; fruits bluish ‘berry’, to 0.38” diameter;

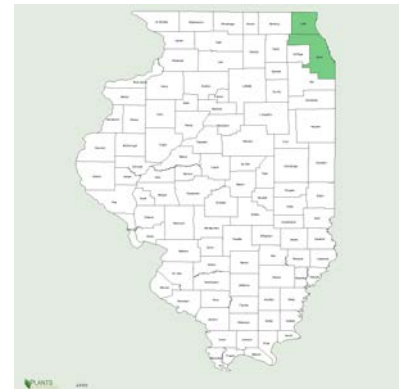
Comments: status: Endangered in Illinois, New Hampshire, & New York. Threatened in Iowa & Vermont. phenology: Blooms C3.

Associates:

VHFS: Cv. ‘Wisconsin’ low spreader with deep green summer color & purple blue winter color, forms dense ground cover 6-8” high, soft texture. Selected by Prof ER Hasselkus, University of Wisconsin-Madison. Hardy to zone 3. Rooted cuttings.

Other cultivars include: ‘Douglasii’ dug-LAS-ee-ee, for the Douglas Nursery, Waukegan, Illinois, Waukegan Juniper; ‘Glauca’ GLOW-ka, for the glaucous foliage; ‘Plumosa’ ploo-MO-sa, for the feathery foliage; ‘Wiltonii’ wil-TON-ee-ee, for South Wilton Nurseries, Wilton, Connecticut.

[*Juniperus horizontalis* Moench var *argentea* hort, *J horizontalis* Moench var *douglasii* hort, *J horizontalis* Moench var *glauca* Hornibr, *J horizontalis* Moench var *variegata* Beissn, *J hudsonica* Forbes, *J prostrata* Pers, *J repens* Nutt, *J virginiana* L var *prostrata* (Pers) Torr, *Sabina horizontalis* (Moench) Rydb, *S prostrata* (Pers) Antoine]





*Juniperus horizontalis*

Line drawing courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image.

**Juniperus virginiana** Linnaeus EASTERN RED CEDAR, aka RED CEDAR, *Miskwa'wak*, red wood (Ojibwa) ((vir-jin-ee-AH-na) of Virginia) facu Section *Sabina*.

Habitat: Ubiquitous, loamy soils on sunny slopes, dry rocky hills, & peaty swamps, & by lakes & streams, old fields, dry woods, cliffs, wooded slopes.

distribution/range: "Woods, cliffs, fields, dune slopes; common throughout Illinois" (m14).

Culture: Macerate, dormant seed or moist cold stratify 90 days; acid scarification 30 minutes. Alternatively, double dormant, sow fresh seed in nursery bed in late fall for germination in two years.

cultivation: Sunny & airy locations, good on tough locations.

Frequent in calcareous soils. Optimum pH 7.0. Hardy to zone ?

Description: Medium tall, evergreen, native tree (40-50' to 90'), bronze winter color. key features: "Leaves of two types, young are needle-like; mature leaves scale-like. Male cones in small, narrow, yellowish spikes; female cones are in small, ovoid, purplish clusters; mature cones dark blue & berry-like. Bark reddish-brown, splitting into long shreds." (Ilpin)

Comments: Inconspicuous blue flowers. Blooms 4. C3. An aggressive seeder.

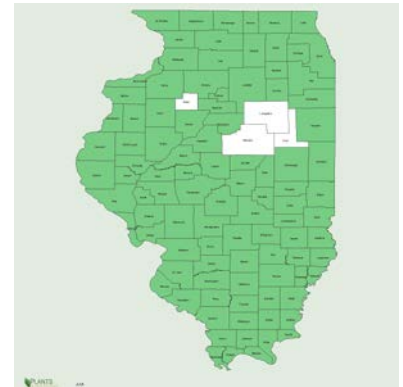
It is noteworthy that when Dr Dobbs wrote his Flora of Henry Co, he knew of very few specimens in all of Henry Co. The largest EASTERN RED CEDAR in Illinois is in Bureau Co.

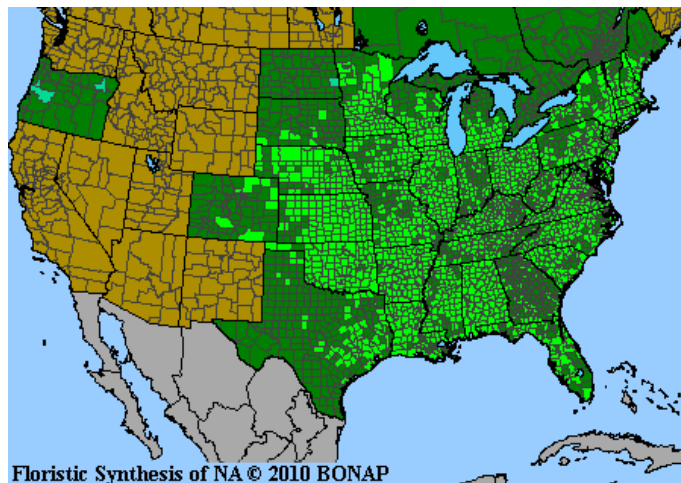
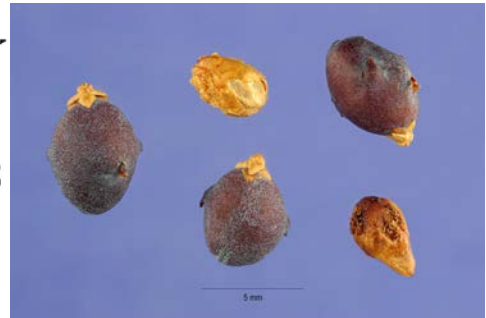
"Common on bluffs, stream banks, prairies, & in ravines. The largest trees in the co are on Rock River Bluff near Roscoe. This small tree has confusing characteristics such as two kinds of leaves & a growth habit that varies from spire-like to widely branching." (ewf55)

Associates: Attracts songbirds & game birds. Food & cover for many species of upland gamebirds & songbirds, including purple finch, evening grosbeak, pine grosbeak, cedar waxwing. Widely spread by birds. Aquatic furbearers eat fruit & wood. Small mammals (esp. white-footed mice) eat fruit. Terrestrial furbearers eat fruit. Deer eat twigs & foliage. Susceptible to cedar-apple rust.

ethnobotany: Wind pollinated; pollen is a source of hay fever. Used as medicinal plant by Ojibwa (Densmore 1928). Bark used for weaving mats & bags by Ojibwa & Pottawatomie (Stowe 1940, Whitford 1941). Ojibwa utility (Densmore 1928). Planted for windbreaks hedges, & wildlife. RED CEDAR wood is almost dry when it is cut. Only the sapwood has sap in it. Cedar heartwood does not absorb moisture. Wood was commonly used for fence posts & cedar chests.

VHFS: Plants with a pyramidal shape & strongly ascending branches may be known as var *crebra* Fern & Griscom (m14). The variety is rare or absent in our area (nw Illinois).





*Juniperus virginiana*

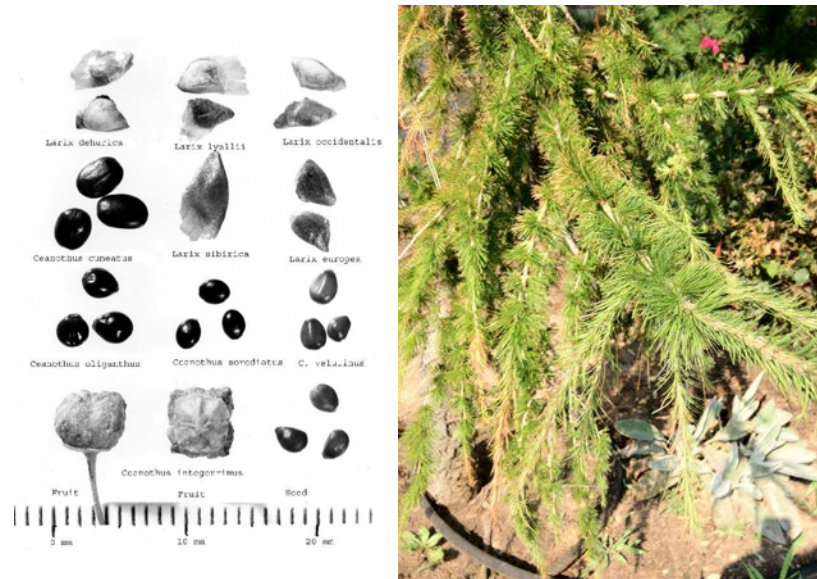
Line drawing courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Illinois map courtesy plants.usda.gov. North America map courtesy of BONAP (2010)

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**LARIX** P Miller 1754 **LARCH** *Pinaceae* (LA-riks) After the classical Latin name, *larix*, *laricem*, from late Greek *λάριξ*, *larix*. A genus of about 10 species of the colder parts of the Northern Hemisphere, 3 species in north America, 1 in eastern North America. **LARCHES** are the only deciduous members of the **PINE** family

Needles are short soft & grow singly on new growth, but occur tuft-like on short spur twigs on old growth, light green in spring, yellow in fall. Cones are small, upright mature in a single season but persist for several years. Fast growing, attractive landscape trees. The wood is resinous, hard, heavy, & used for railroad ties, utility poles, flooring, & cabinetry.

*Larix decidua* Mill EUROPEAN LARCH is rarely escaped from cultivation in Cook, DuPage, & Lake cos in northeast Illinois. Sp commonly planted as an ornamental & experimentally as a forest tree, persisting & sometimes escaping, as in the high mountains of NC (w12). EUROPEAN LARCH prefers well-drained soils, while AMERICAN LARCH grows in swamps & forested bogs. The mature seed cones of EUROPEAN LARCH are 0.75-1.50" in length, with about 10-20 glabrous cone scales & first-year twigs pale yellow. AMERICAN LARCH has female cones 0.5-0.75" in length, about 40-50 puberulent scales per cone, & first year twigs reddish brown. The epithets are reversed in m14.

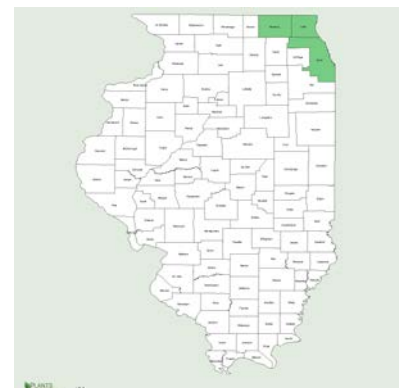


Seed photo courtesy of USDA Forest Service USDA-NRCS PLANTS Database. Photo showing single & tufted needles (*L. decidua* 'Varied Directions').

***Larix laricina* (Du Roi) K Koch EASTERN LARCH, aka AMERICAN LARCH, BLACK LARCH, HACKMATAK, TAMARACK, *Mu'ckigwatig*, swamp tree (Ojibwa) (*laricinus* larch-like.)**

**Habitat:** Mostly in swamps in the Great Lakes region, cold, deep swamps & (to the north) drier uplands. Common in boreal forests in wet, poorly drained bogs & swamps, also on moist uplands. **distribution/range:** Bogs, rare in Illinois, Cook, Lake, & McHenry cos (m14).

**Description:** Native, fast growing, needle-leaf, deciduous conifer, medium to large tree, 40-80(125)', in harsh climates may be a ground hugging shrub; crown narrow, pointed-top, sparse, irregular branches; bark on young trees gray smooth, older trunks scaly reddish brown, inner bark red-purple, bark tight fitting, brown to reddish, flakes off in small round scales; winter silhouette like a dead spruce, with long branches at erratic angles & a haze of yellow twigs; twigs orange-brown, hairless, slender with obvious small knobby buds & spur branches, buds dark red; needles 0.5" (0.38-1.0, soft, flattened, shorter than western Larches, in bunches or bunches radiating from short, spur twigs, but singly on new growth; blue-green (bright green) summer foliage, yellow to gold (pale yellow) fall color; cones 0.5", inconspicuous, standing upright along twigs, scales relatively narrow, dark reddish turning yellow-brown, (mature 2<sup>nd</sup> fall in one source), young female cones pinkish, upright, male cones yellow, below the twigs. **key features:** "Fascicles of 20-50 needles, short, deciduous, pale green; small, ovoid cones." (Ilpin)



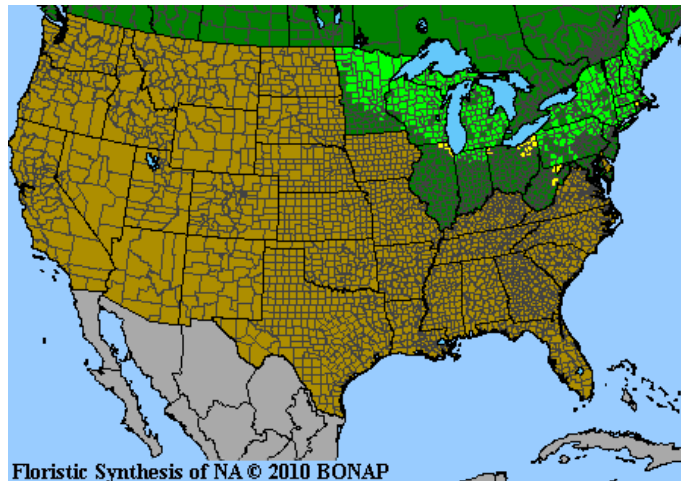
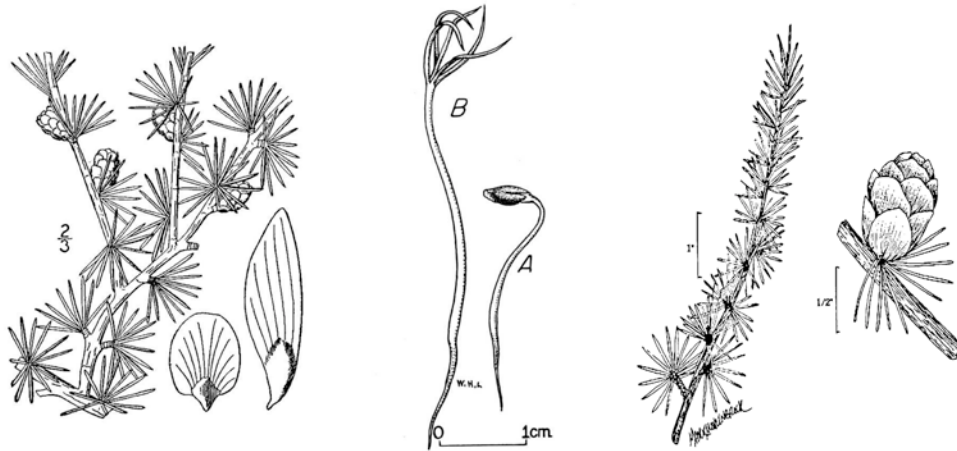
Culture:

cultivation: Moist soils. Optimum pH 6.0. Hardy to zone 2.

Comments: status: phenology: Blooms male & female cones emerge in early spring with the leaves (March - April). C3. Needs ample moisture. Hates heat. The only native northern deciduous conifer.

Associates: Wind pollinated. Seeds used by spruce grouse & crossbill, & small mammals. Deer may browse on the needles.

ethnobotany: Bark used as medicinal beverage by Pottawatomie, Menominee, & Ojibwa (sm33, 32). Ojibwa burn medicine (den28). Ojibwa & Algonkins used it as a utility plant. Roots used to sew canoes & to make bags by Ojibwa (sm32). Ojibwa utility plant (den28). Bark said to be laxative, tonic, diuretic, & alterative (den28).



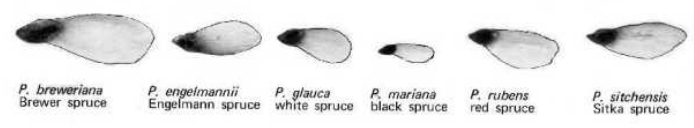
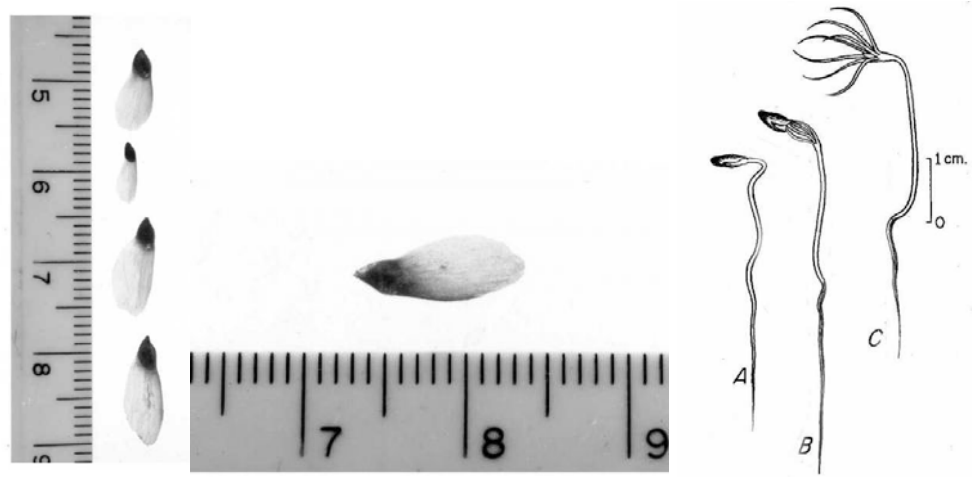
*Larix laricina*

1st line drawing courtesy of Kentucky Native Plant Society. 2<sup>nd</sup> line drawing W.H.L. @ USDA-NRCS PLANTS Database. 3<sup>rd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Illinois map courtesy plants.usda.gov. North America map courtesy of BONAP (2010).

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**PICEA** A. Dietrich 1824 **SPRUCE, ÉPINETTE** *Pinaceae Picea* from the classical Latin name for pitch-producing pine, from *pix, picis*, pitch or tar. A genus of about 35(40) species of evergreen conifers of the cool temperate & boreal Northern Hemisphere, northern North America with 7 native & one naturalized species. x = 12.

Spruce have needles single, pointed, & prickly, leaving a raised leaf scar on the twig upon falling. Cones hang down, form mostly on upper branches, & have thin, papery scales. Trees have narrow conical silhouette. Spruce wood is used for construction lumber, piano sounding boards, & paper pulp.



*Picea* species

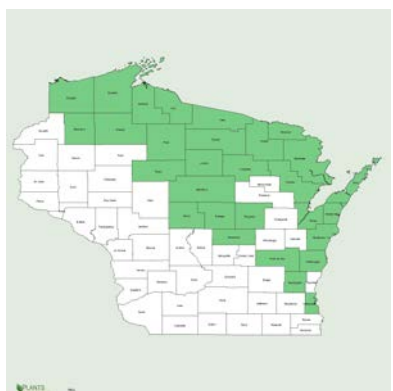
Photos courtesy of USDA Forest Service USDA-NRCS PLANTS Database.

**Picea canadensis** (P Miller) Britton, Sterns & Poggenburg, WHITE SPRUCE ((kan-a-DEN-sis) of Canada or NE USA.) See *Picea glauca*.

**Picea glauca** (Moench) Voss WHITE SPRUCE, aka BLACK HILLS SPRUCE, CAT SPRUCE, ÉPINETTE BLANCHE, PORSILD SPRUCE, SKUNK SPRUCE, WESTERN WHITE SPRUCE, (*glaucus -a -um* glau'cus (GLAW-kus) gray, bluish-green or gray, covered with 'bloom', from Latin *glaucus -a -um*, bluish-gray or greenish-gray, from Greek γλαυκός, *glaukos*, for the glaucous needles.) Some common names refer to the smell of the crushed needles.

Habitat: Low damp woods in good soils. "Muskegs, bogs, & river banks to montane slopes; 0--1000m" (fna). distribution/range: Native n of Illinois; rarely escaped from cultivation; DuPage Co (m14). Boreal, north of our area.

Culture:



**cultivation:** Commonly cultivated. Tolerant of some shade. Prefers cool, moist sites. Dry to dry mesic uplands. Optimum pH 5.4. Hardy to zone 2 (2-6).

**Description:** Native, needle-leaf, evergreen tree, medium to large, fairly fast growing 40-60' in the east, low creeping form at the tree-line; silhouette broadly conic, frequently spire-like; bark gray brown, scaly; twigs slender, pinkish brown, branches slightly drooping, branchlets drooping or not; needles 0.188-0.25" or 0.50", blue green (pale grayish-blue-green; dark green to bluish), slightly prickly, not flattened, 4-angled in cross section; young female cones upright, red to purple, young male cones yellowish, mostly below the branches, in early spring, cones 1.75", scales broad, flat-tipped; immature cones green or purple, mature cones red brown.  $N 2n = 24$ .

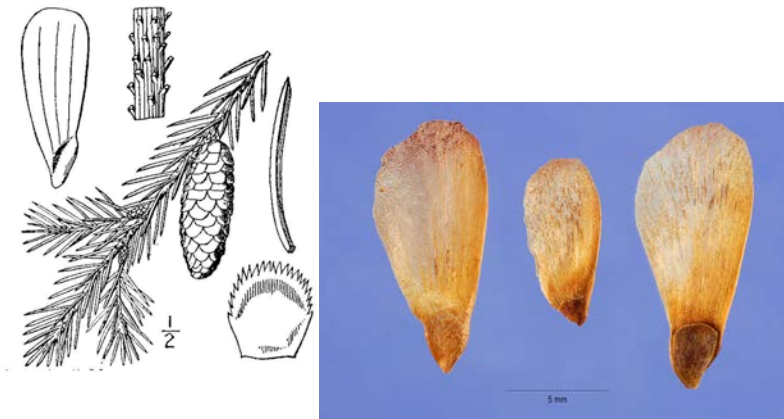
**Comments: status: phenology:** Blooms Variable, with several sub species, which may be environmental forms or hybrids.

Provincial tree of Manitoba & state tree of South Dakota.

**Associates:** Provides nesting, roosting, & winter cover for many species, including spruce grouse, crossbill, red squirrel, varying hare, & porcupine.

**ethnobotany:** Used as medicinal beverage by Menominee & Ojibwa (sm23, 45; sm32, 379) As *P canadensis*, Ojibwa stiff joint medicine (den28).

**VHFS:** In Britton & Brown (1913), this species is *P canadensis*. [*Abies canadensis* Mill, *Picea alba* (A) Link, *P albertiana* S Br, *P canadensis* (Mill) BS&P, *P canadensis* (Mill) BS&P var *glauca* (Moench) Sudw, *P glauca* (Moench) Voss var *albertiana* (S Br) Sarg, *P glauca* (Moench) Voss var *densata* LH Bailey, *P glauca* (Moench) Voss var *porsildii* Raup, *Pinus alba* Aiton, *P glauca* Moench] Hybridizes with ENGELMANN SPRUCE. Several cultivars available.



*Picea glauca*

Line drawing courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Wisconsin map courtesy plants.usda.gov.

***Picea mariana*** (P Miller) Britton, Sterns & Poggenburg BLACK SPRUCE (*marianus -a -um* (ma-ree-AH-nus) of Maryland)

**Habitat:** Bogs. **distribution/range:** Native n & e of Illinois; apparently adventive in a bog in Lake Co (m14). The Illinois population is at the southern limit of the species range.

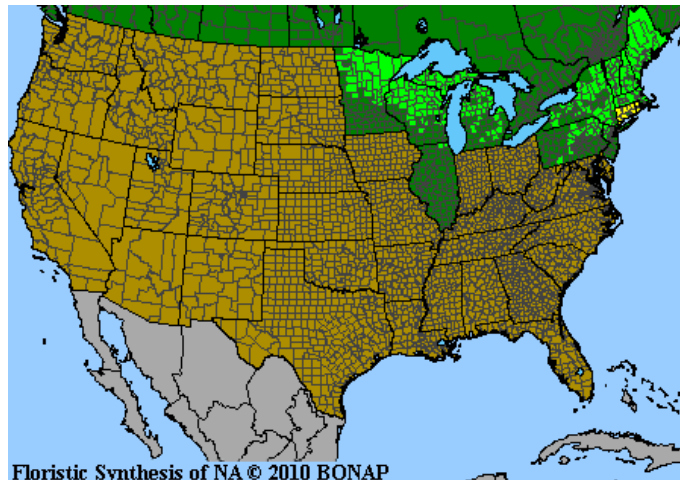
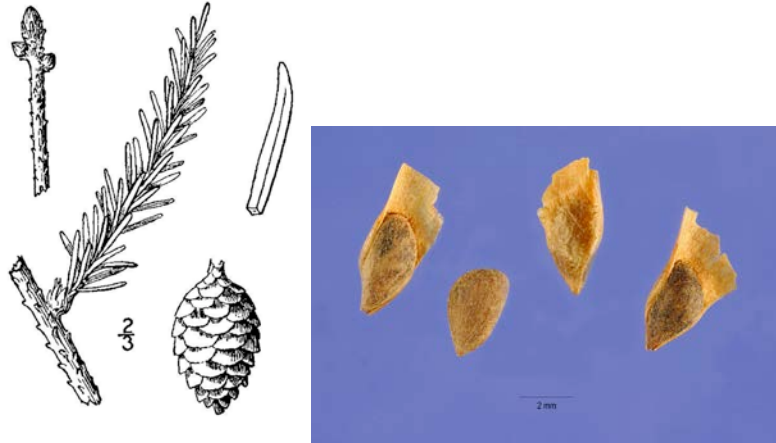
**Description:** Needle-leaf, evergreen, native tree, 25-30' tall; stems hairy; leaves are 4-sided needles 0.25-0.50" long, often bluish green with white bloom; fruits are >1.25" cones which stay on tree when ripe.

**Associates: ethnobotany:** Used as medicinal plant by Ojibwa & Pottawatomie (sm32, 379, sm33, 70). Used for sewing & sealing birchbark canoes with roots & pitch by Ojibwa (sm32).

**VHFS:** [*Abies mariana* Mill, *Picea mariana* (Mill) BS&P var *mariana*]







*Picea mariana*

Line drawing courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Illinois map courtesy plants.usda.gov. Illinois map courtesy plants.usda.gov. North America map courtesy of BONAP (2010)

***Picea rubens*** Sargent RED SPRUCE, aka *ÉPINETTE ROUGE*, HE BALSAM, *ROTFICHTE*, YELLOW SPRUCE,

**Habitat:** Upper montane to subalpine forests. In the southeast US, “Common to dominant in spruce & spruce-fir forests at high elevations, scattered in northern hardwood forests, heath balds, boulderfield forests, ridges, & rarely coves, also in bogs or swampy forests at lower elevations (down to about 1000 m), ranging in moisture tolerance from dry ridges (though these are often fog-bathed) to saturated peats, & sometimes planted & naturalized: (w12). **distribution/range:** Nova Scotia, New Brunswick, Ontario, Quebec, New England, eastern New York, south along the Appalachians.

**Culture:** propagation:

asexual propagation:

cultivation: Rarely cultivated. Hardy zones 3-5.

bottom line:

greenhouse & garden:

**Description:** Native, needle-leaf, evergreen tree, medium to large, 60-70(-162)’ tall; crown narrowly conic; branches horizontally spreading, twigs not pendent, orange brown, somewhat hairy; needles 0.625” long, green, not flattened, relatively short & dense; cones 1.0-1.5”, reddish brown, scales broad, rounded, immature cones short, dark bluish; N 2n = 24. **key features:**

**Comments:** status: phenology: Blooms May - June. Cones mature October. “Throughout the Appalachians,

trees of *Picea rubens* are dying, possibly as a consequence of environmental pollution” (fna). This decline is possibly due to acid rain. Provincial tree of Nova Scotia.

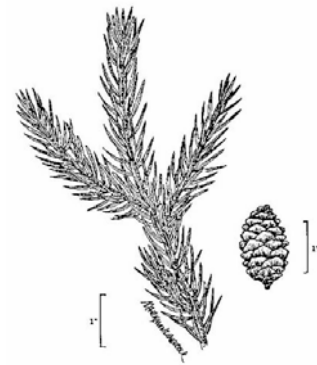
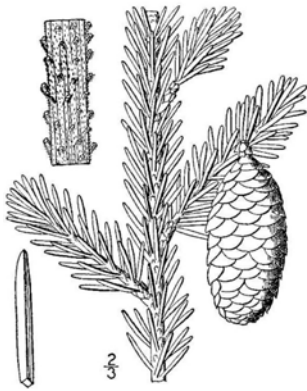
“*Picea mariana* (P. Miller) Britton, Sterns, & Poggenburg, Black Spruce, ranges south to s PA & n NJ, & has also been reported from bogs in our area: for NC (Small 1933) & for VA (Fernald 1950). These reports are apparently based on misidentifications of short-leaved, bog-inhabiting populations of *P. rubens*. Hardin (1971b) discusses the existence of these southern populations of *P. rubens* growing in bogs (notably Long Hope Valley, Ashe & Watauga cos, NC & Pineola Bog, Avery Co, NC) with shorter than normal leaves (8-10 mm long vs. 12-15 mm long). He suggests that "this may be ecotypic, but one wonders whether the short leaves & bog habitat might reflect a few Black Spruce genes that have persisted since the Pleistocene." Further study with modern electrophoretic & molecular techniques is warranted.” (w12)

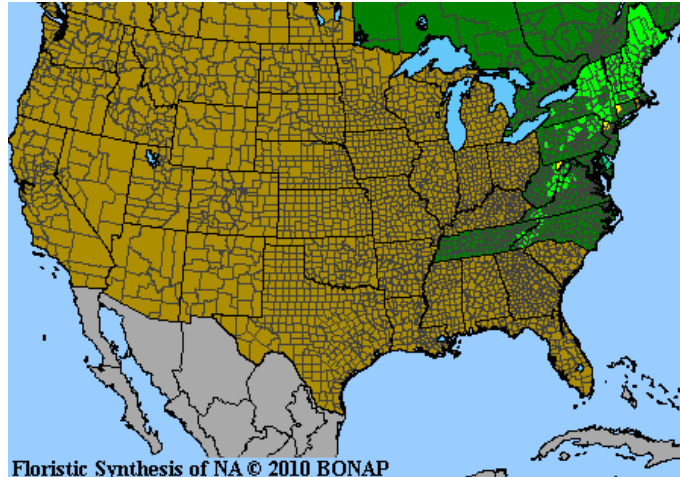
Associates:

ethnobotany: As *Picea rubra* (Duroi) Dietr, spruce, *Cingob'* Ojibwa utility plant. (den28).

VHFS: [*Picea australis* Small, *P nigra* (Ait) Link var *rubra* (DuRoi) Engelm, *P rubra* (DuRoi) Link 1831, not A Dietrich 1824]

JW Hardin, 1971, Studies of the southeastern United States flora. II. The gymnosperms. J Elisha Mitchell Sci Soc 87: 43-50.





*Picea rubens*

1st line drawing courtesy of Kentucky Native Plant Society. 2nd line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species.* USDA Natural Resources Conservation Service. Not copyrighted image. Photos by Robert H. Mohlenbrock, W. D. Bush, C. A. Abell, & W. D. Brush - USDA-NRCS PLANTS Database - Not copyrighted images. North America map courtesy of BONAP (2010)

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**PINUS** Linnaeus 1753 **Pine Family** *Pinaceae* *Pinus* Pi'nus (prim & properly pronounced PIE-nus, but PEE-nus; properly pronounced in classical Latin, *Pinus* rhymes with *Venus*) from classical Latin *pīnus*, *pīni*, f, or *pīnus*, *pīnus* f, pine tree, pinewood, ship, mast, oar, torch, probably from the same Indo-European base as ancient Greek πῖτος, *pītys*, pine tree, & the first element of Sanskrit *pītudāru*, denoting a kind of pine, akin to Sanskrit *pitu* drink, food. A genus of about 100 (110) species of evergreen coniferous trees, of the Northern hemisphere south into Central America, north Africa, & the Pacific Islands in Sumatra. Important cover & roosting for many species, including spruce grouse, chickadee, crossbills, nuthatch, pine siskin, pine warbler, squirrels, & deer. The genus name is feminine gender, as evidenced by most specific epithets, but one wonders about *strobis*. Formerly *Apinus* Necker ex Rydberg, *Strobis* (Sweet) Opiz, & *Caryopitys* Small. x = 12

Pines are divided into two broad groups, WHITE PINES & YELLOW PINES. The names are a reference to the color of the wood. WHITE PINES have needles that are slender & flexible, usually in bundles of 5, with the needle sheath shed soon after the needles are full grown; twigs smooth after needles fall; cones often with stalks, often narrow with thin, flexible scales & no prickles; bark thin, scaly, & dark. YELLOW PINES have needles that are thick & stiff, usually in bundles of 2-3, with the needle sheath persisting after the needles are full grown; twigs usually rough after needles fall; cones often without stalks, often broad with woody scales & large to small prickles; bark often with broad orange plates. Several species have intermediate characteristics.

Many native North American species are being planted well outside their native ranges, with formerly isolated but closely related species growing on close proximity. New hybrids are inevitable.

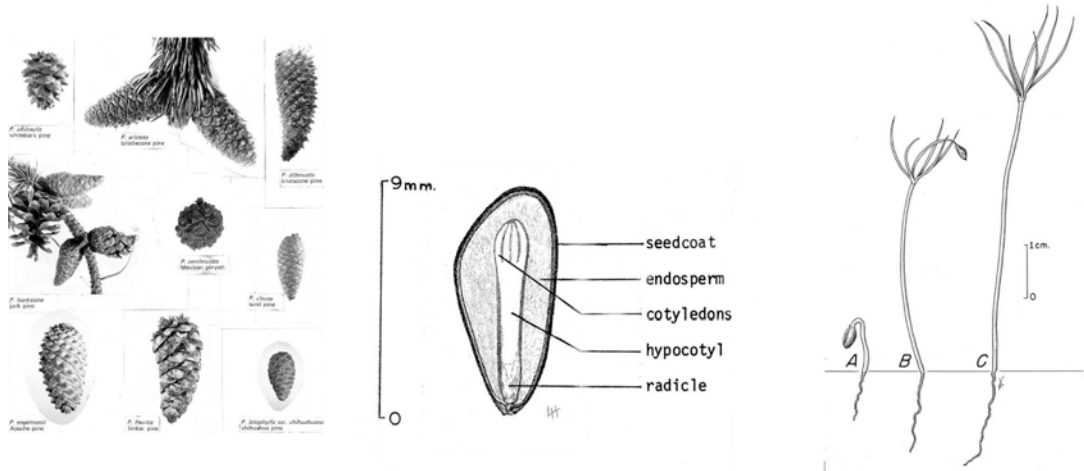
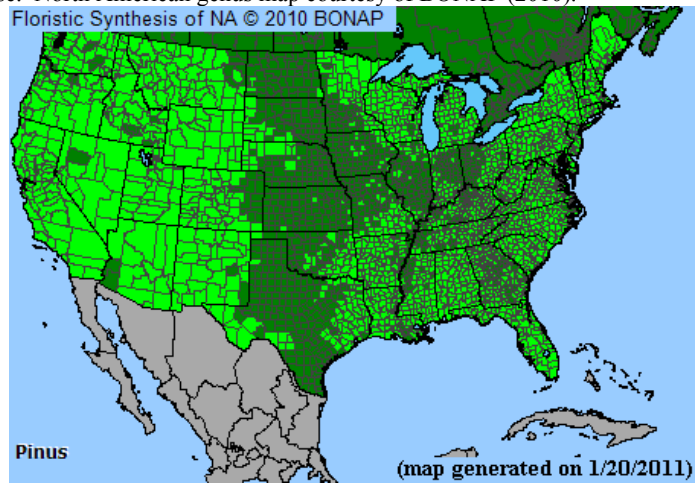
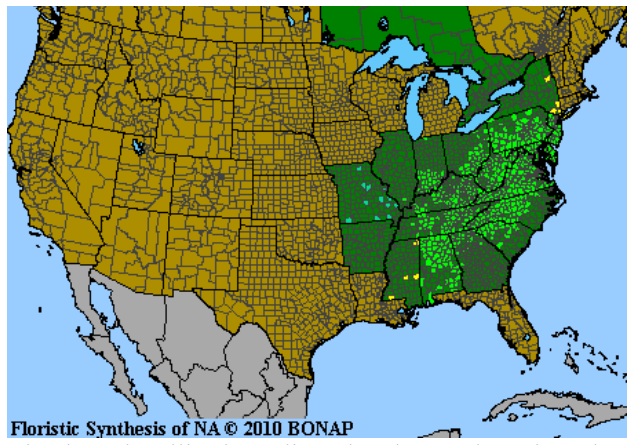
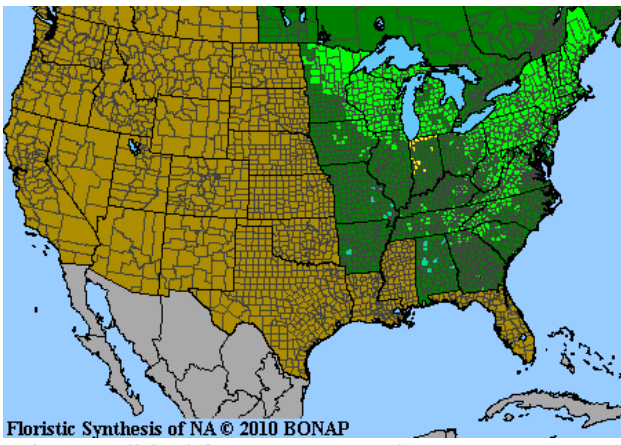


Photo courtesy of the US Forest Service USDA-NRCS PLANTS Database. Line drawings L. H. courtesy of the US Forest Service USDA-NRCS PLANTS Database. North American genus map courtesy of BONAP (2010).



The distribution of *Pinus* in the United States clearly shows the Prairie Peninsula. Examining *P. strobus* & *P. virginiana* co maps in BONAP, it is interesting how their records abruptly stop at the Illinois-Indiana state line.



Biogeopolitical front: *Pinus strobus* & *P. virginiana* poised on the Illinois-Indiana border ready to invade.

**Pinus banksiana** Lamb. JACK PINE, aka GREY PINE, *PIN GRIS*, SCRUB PINE,

Habitat: Sterile, sandy soils. “Fire successional in boreal forest, tundra transition, & in dry sandy or rocky, barren soils” (Kral in fna).

distribution/range: “Sandy soil, sometimes escaped from plantings n ¼ of Illinois (m14). Rare in Illinois, Cook, Jo Daviess, Kendall, Lake, & Ogle cos (bonap 2011 maps it from Logan Co). Illinois is at the southern edge of this species range.

Culture: propagation:

asexual propagation:

cultivation: Optimum pH 5.5. Hardy zones 2-6.

bottom line:

greenhouse & garden:

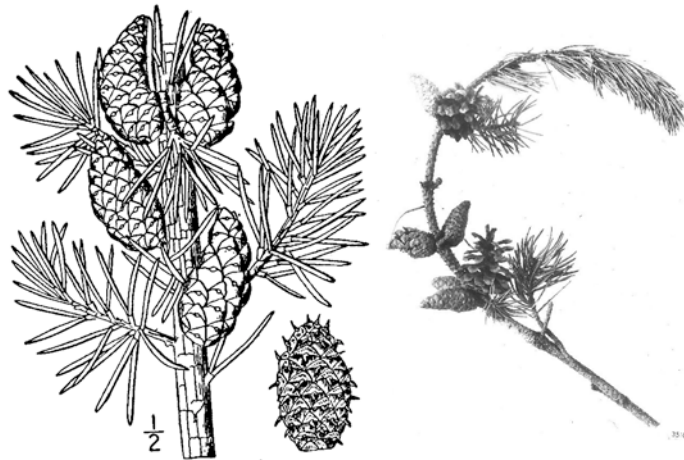
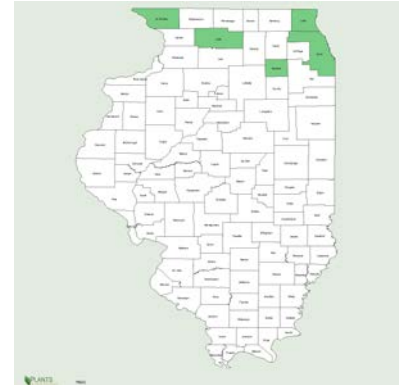
Description: Native, needle-leaf, evergreen tree, 30-50(97)', usually crooked, leaning, gaunt, & yellow green, with many persistent cones; crown irregular, often flat-topped; bark orange to red-brown, scaly; needles in twos, very short, 1.25", yellow-green, stiff, divergent, & twisted, persisting 2-4 years, relatively sparse on twigs; cones 2", curved, pointing towards the tip of the twig, unopened cones sickly gray white, persistent, some trees have cones that open, some trees have cones that open after a fire; N 2n = 24. key features: The only eastern pine with short needles & curved cones.

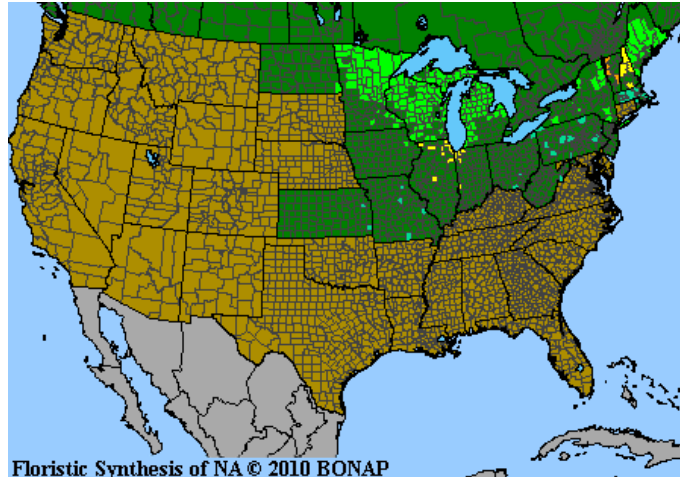
Comments: status: Endangered in Illinois. Rare in Indiana & New York. Threatened in New Hampshire & Vermont. phenology: Good on poor soils, xeriscaping. Fast grower. Important pulpwood tree. Usually a crooked, irregular tree with short needles, jutting branches, & numerous persistent cones. Closed cones opened by extreme heat. Territorial Tree of Canada's Northwest Territories.

Associates: In Michigan, KIRTLAND'S WARBLER nests only in prescribed-burned, open-grown, scrubby JACK PINE stands.

ethnobotany: Used as medicinal plant by Ojibwa, Menominee, & Pottawatomie (sm23, 32, 33). Roots used for canoe & other coarse sewing by Ojibwa, Pottawatomie, & Menominee (sm23, 32, 33).

VHFS: Closely related to & hybridizes with LODGEPOLE PINE, where the ranges overlap. Also closely related to VIRGINIA PINE & SAND PINE.





*Pinus banksiana*

1st line drawing courtesy of Kentucky Native Plant Society. Photo originally from US Forest Service. United States, WI, Adams Co. 1917.USDA-NRCS PLANTS Database, National Agricultural Library. Illinois map courtesy plants.usda.gov. North America map courtesy of BONAP (2010)

***Pinus resinosa*** Aiton (or *Pinus resinosa* Soland.) \*CT, IL, NJ RED PINE, aka CANADIAN PINE, NORWAY PINE, *PIN ROUGE*, YELLOW PINE, *Jingwak'* (Ojibwa) (*resinosus -a -um* full of resin.) “The misleading alternate name NORWAY PINE for this New World species may be traced to confusion with NORWAY SPRUCE by early English explorers. Another explanation is that the name comes from the trees occurrence near Norway, Maine, founded in 1797. Because the name was in usage before this time, the former explanation is more likely.” (lbj)

Habitat: Common in dry woodlands, sandy soils, eastern boreal forests.

distribution/range: Dry woods, rare; LaSalle Co, adventive elsewhere (m14). Rare in Illinois, Jackson, Lake, & LaSalle cos.

Culture: propagation: “Seeds have no dormancy & will germinate immediately upon sowing. Pretreatment is usually not necessary, but germination of pine seeds exhibiting dormancy can be hastened by cold stratification.” (lbj)

asexual propagation:

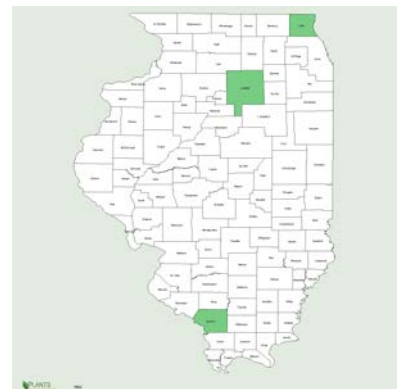
cultivation: Sandy or gravelly, acid soils. Not for clay soils. Dry to well-drained soil of medium fertility. Optimum pH 5.5 (<6.8). Hardy zones 2-5.

bottom line:

greenhouse & garden:

Description: Native, needle-leaf, evergreen tree, medium to large, 50-80(-154)'; crown narrowly rounded to oval, branches spreading; young trees with bark pale silvery red brown bark in plates, in age furrowed in irregular ridges; trunk straight, pale silvery & reddish; twigs stout, rough, with tufts of dark needles; needles in 2(3)s, 3-8", rigid, straight, often yellow green, persisting 2-4 years; cones small, 1.5-2.5", not prickly, small among the long needles;  $2n = 24$ . key features: Needles snap clean when bent. Similar to the cultivated & naturalizing AUSTRIAN & JAPANESE BLACK PINES. RED PINE differs with thinner, silvery-red bark, long straight trunk, brittle needles, non-prickly cones, & red brown winter buds vs. pale silvery winter buds. Comments: status: Endangered in Connecticut, Illinois, & New Jersey. phenology: March - May. Adaptable, an important timber & pulp tree, formerly prominent in Great Lakes pineries. Very commonly cultivated & naturalized. Now used as an ornamental & shade tree.

Associates: Larval host of *Lapara bombycoides* NORTHERN PINE SPHINX. Attracts songbirds, upland gamebirds, & mammals.



In a Wisconsin pine plantation, water extracts of leaves from *Prunus serotina* BLACK CHERRY, *Rubus idaeus* RED RASPBERRY, *Eurybia macrophylla* BIGLEAF ASTER, *Lonicera tatarica* TATARIAN HONEYSUCKLE, *Solanum dulcamara* CLIMBING NIGHTSHADE, & *Solidago gigantea* GIANT GOLDENROD reduced red pine height growth, number of secondary needle fascicles, weight increments of roots & shoots, & radicle elongation of red pine seedling (Norby & Kozlowski 1980).

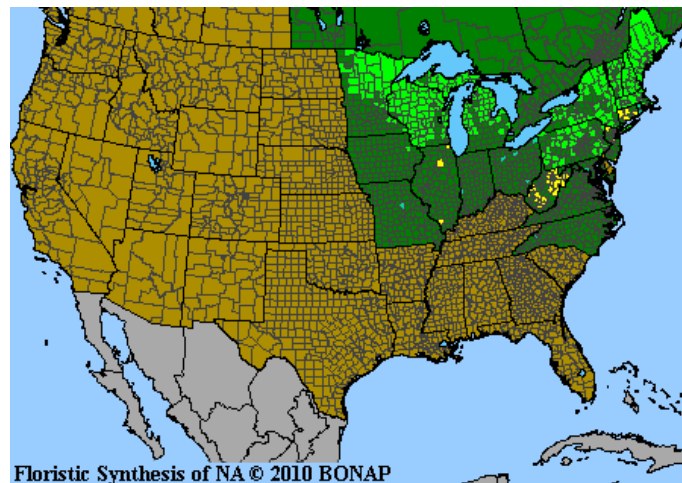
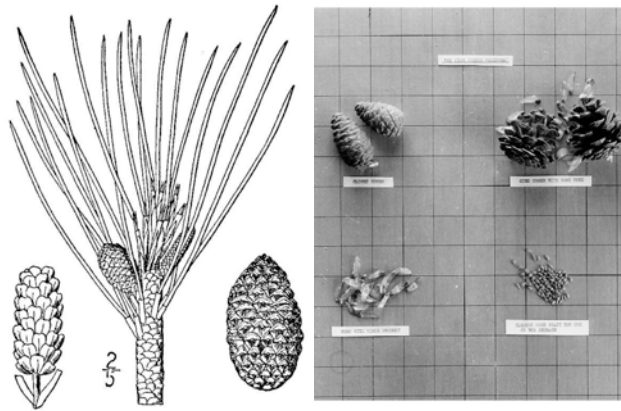
ethnobotany: Used as medicinally as a stimulant, relief from headaches & backaches, & a reviver for coma victims by Ojibwa & Pottawatomie (sm32, 33). Used for sewing & sealing birch bark canoes or birch bark roofs with roots & pitch (resin) by Ojibwa (sm32). Ojibwa & Chippewa technology plant (den28).

The wood is used for general construction, planning mill products, & pulpwood. The moderately hard wood readily absorbs preservatives, making it useful for structural beams, bridges, piles, & railway ties.

VHFS:

AS Hauser, 2008. *Pinus resinosa*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2012, June 19].

RJ Norby & TT Kozlowski, 1980. Allelopathic potential of ground cover species on *Pinus resinosa* seedlings. *Plant & Soil*. 57(2): 363-374.



*Pinus resinosa*

Line drawing courtesy of Kentucky Native Plant Society. Photo Leland J. Prater. Provided by National Agricultural Library. Originally from US Forest Service. United States, WI, Nicolet National Forest. 1937. Illinois map courtesy plants.usda.gov. North America map courtesy of BONAP (2010)

**Pinus strobus** Linnaeus EASTERN WHITE PINE, aka PUMPKIN PINE, WEYMOUTH PINE, WHITE PINE, *Jingwak*' (strobis (STRO-bus) *strobis*, a cone, the Latin name for a gum-yielding tree (unconfirmed) *Pinus*, as all tree genera is a feminine noun, while *strobis* is a noun in apposition to *Pinus*, which does not have to agree in gender.)

Habitat: Light fertile loam & sandy soil, light fertile loam & sandy soils of granitic origin (y). distribution/range: *P. strobus* is the only WHITE PINE in its range.

cultivation: Well-drained soil of medium fertility, can tolerate partial shade. Optimum pH 7.6. Hardy to zone 3 (3-7).

Description: Native, needle-leaf, evergreen tree, 50-80 or 100(220)' tall, soft textured, plume-like outline, mature trees typically with an irregular, often statuesque, silhouette, with long horizontal branches, often irregular in outline; bark on young trees pale gray-green & smooth, on mature trunks, bark dark gray, often tinged with purple, more or less furrowed; slender needles to 4.0" in bundles of 5, bluish green, straight, slender, forming triangular clusters angled towards branch tips; stalked cones lacking prickles, immature cones slender, green, hanging in clusters, mature cones 5.5" long, relatively slender, with relatively long stalks & thin scales, often with dots of sap, not persistent. key features: "Needles are in 5's; long, oblong cones maturing in second year; needles are blue-green, soft." (Ilpin)

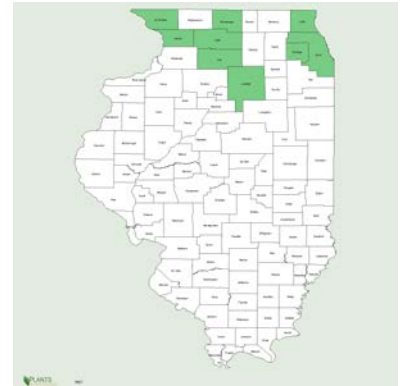
Comments: status: phenology: Blooms C3. A handsome, valuable timber & landscape tree. Species is a typical part of conservation & windbreak plantings. Many sand hills in NW Illinois are monocultures of this species. Older, open grown trees are the stuff that *bonsai* plants aspire to become. The dramatic Midwestern specimens seen on old farmsteads & cemeteries require several human generations to develop. Plant some for your grand children & great grandchildren today. Wax on, wax off.

"On a limestone outcrop in the "Dells" of Hall Creek in Section 35 Winnebago Township 5 miles southwest of Rockford are several old trees in a situation where it is quite impossible for them to have been planted. The next nearest that we know of in a ravine 3 miles west of Oregon." (ewf55)

Associates: Wind pollinated. Living near large stands of WHITE PINES, such as Sand Ridge State Forest where your car may be yellow with pollen in the spring, may mean in you live in spring allergy Hell. Songbirds eat the seeds, especially crossbills & pine siskin. Small mammals eat the fruits & twigs. In winter, rabbits will eat any parts they can reach & get in their mouth. Deer browse the needles.

ethnobotany: Young staminate catkins available in spring. Inner bark in May & early June. Ojibwa & Iroquois used it for food (sm32, Waugh 1916). Used as medicinal beverage by Menominee (sm45). Ojibwa & Pottawatomie used for medicine (sm32, 33). Pitch used for sealing canoes by Pottawatomie & Ojibwa (sm32, 33). Pitch used for caulking & waterproofing. Wood used to make dishes. Ojibwa utility plant (den28). In the early 1800s, nine out of every ten boards were of this species.

VHFS: Many attractive selections & cultivars, including dwarves & weeping forms.





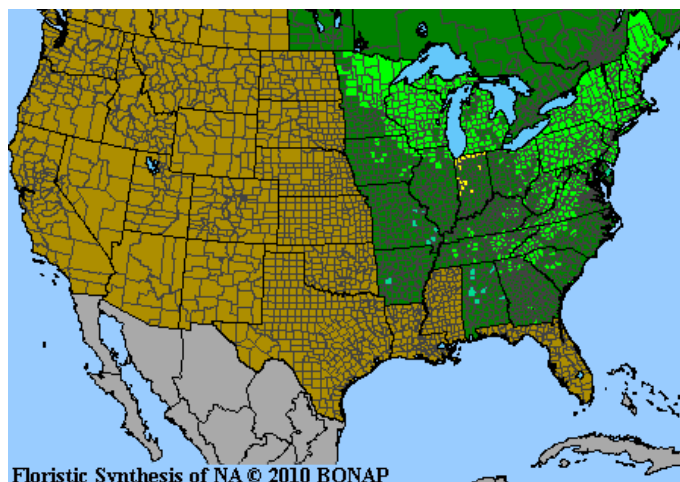


*Pinus strobus*, sandstone cliff, Tomahawk Bluffs, LaSalle Co



*P strobus*, weeping selection





*Pinus strobus*

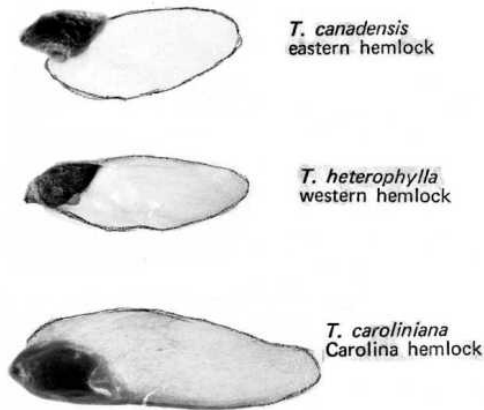
Line drawing courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Second line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Illinois map courtesy plants.usda.gov. North America map courtesy of BONAP (2010)

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**TSUGA** Carrière 1847 **HEMLOCK, PRUCHE, TSUGA, NAMPAN**, *Pinaceae Tsuga* (TSOO-ga) from the Japanese name 榊 (ツガ), *tsuga*, *nampan*, the name of *Tsuga sieboldii*. A genus of about 8-10 (14) species of evergreen trees of North America & eastern Asia, China, Japan, & Taiwan. 4 species native to North America, 2 species to eastern North America, one western hybrid. HEMLOCKS have short flat needles, small pendant cones, & branches drooping at the tip. HEMLOCK bark was an important commercial source of tannin. *Tsuga heterophylla* WESTERN HEMLOCK is harvested for tannin & pulpwood. The common name is from the supposed similarity of the crushed foliage to that of POISON HEMLOCK. 2 Japanese species are commonly cultivated. x = 12

Trees are usually broader than spruces & firs, with fine lacy twigs with gracefully drooping tips; all new growth drooping gracefully at tips; bark on young trunks dark gray brown, peeling in rectangular scales, bark on old trunks gray, ridged & furrowed; male cones small, yellow, below the twig, female cones small green or purplish, at the tip of the branch.

Both eastern HEMLOCK species are threatened by *Adelges tsugae* HEMLOCK WOOLY ADELGID, a true bug that sucks sap that was accidentally introduced from Asia in 1924. Their egg sacs resemble small tufts of cotton on the underside of HEMLOCK branches. The bug is established in 11 eastern states, in more than 50% of *T. canadensis*' range. Infestations are usually fatal, with the potential loss of *Tsuga* from eastern forest ecosystems.



### *Tsuga* species

Cone & seed photos - USDA-NRCS PLANTS Database - Not copyrighted image

***Tsuga canadensis*** (Linnaeus) Carrière HEMLOCK, Aka CANADIAN HEMLOCK, EASTERN HEMLOCK, HEMLOCK SPRUCE, *HEMLOCKTANNE*, *PRUCHE DE L'EST*, *PRUCHE DU CANADA*, WEEPING HEMLOCK, *Gaga'gimic* (Ojibwa) (*canadensis* -si -e (kan-a-DEN-sis) of Canada or NE USA.)

Habitat: Well drained uplands & ravine slopes in “climax forest” of upper Great Lakes. Common but local in moist rocky ridges, steep ravines slopes, & cool, wet swales. distribution/range: Native north, east & south of our area.

cultivation: Commonly cultivated. Plant in protected locations. Shade tolerant. Hardy zones 3-7.

Description: Native, needle-leaf, evergreen tree, medium to large, 40-70(-179)'; pyramidal; twigs yellow-brown, densely hairy; needles 0.5", flattened, blunt, persist 2 years, underleaf pale silvery, needles strongly 2-ranked; key features: Needles & cones are shorter than other hemlocks.

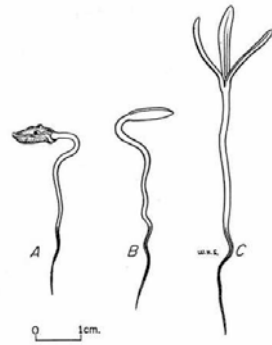
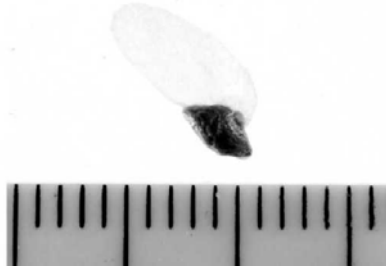
Comments: status: phenology: Blooms

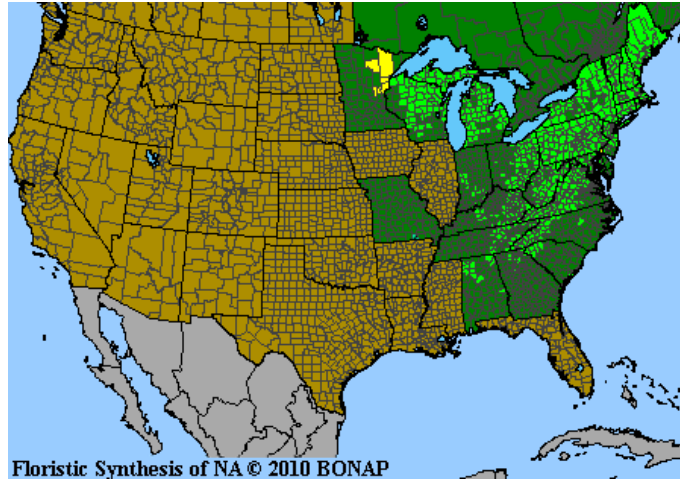
The largest HEMLOCK in Illinois is an ancient landscape specimen in Jock Ingels' front yard, Nursery Lane, LaFayette, Stark Co.

Associates: Good winter & nesting cover for many species. Used by crossbill, pine siskin, porcupine, & deer. Rabbits will clip lower limbs, eat the bark, eat the sapwood & kill small specimens in winter.

ethnobotany: Leaves available anytime. Used by Ojibwa for beverage (sm32, Bakeless 1950). Used by Ojibwa for food (den28). Used as medicine by Ojibwa & Pottawatomie (sm32, 33). Ojibwa medicine for hemorrhaging wounds (den28). Canada pitch is obtained from this tree & is a gentle rubefacient (den28). Used for dye by Ojibwa & Menominee (sm23, 32, den28). Bark used for wigwam covering by Ojibwa (Gilmore 1933).

VHFS: Numerous cultivars are sold, including shrubs, dwarfs, & large graceful trees.





*Tsuga canadensis*

Line drawing courtesy of Kentucky Native Plant Society. Cone & twig photo W. D. Brush - USDA-NRCS PLANTS Database - Not copyrighted image. North America map courtesy of BONAP (2010)

***Tsuga caroliniana*** Engelm. CAROLINA HEMLOCK, aka HEMLOCK,

Habitat: Uncommon & local on rocky montane slopes. distribution/range: Blue Ridge Mountains, Georgia, North Carolina, South Carolina, Tennessee, & Virginia.

Culture: propagation:

asexual propagation:

cultivation: Commonly cultivated. Hardy zones 4-7.

bottom line:

greenhouse & garden:

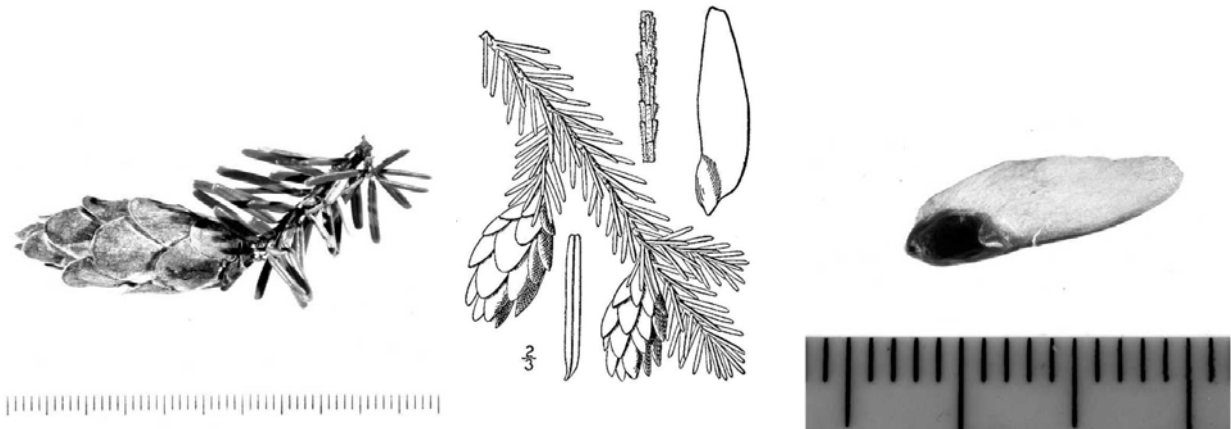
Description: Native, needle-leaf, evergreen tree, medium to large, 100-140'; twigs light brown, thinly covered with short, dark hairs; needles 0.625", like eastern, but slightly longer, persist 4 years, underleaf whitish, needles mostly not 2-ranked; cones 1.0" scales long like *T heterophylla*;  $N 2n = 24$ . key features: Similar to Eastern hemlock but needles slightly longer & not in flat sprays, cones slightly longer.

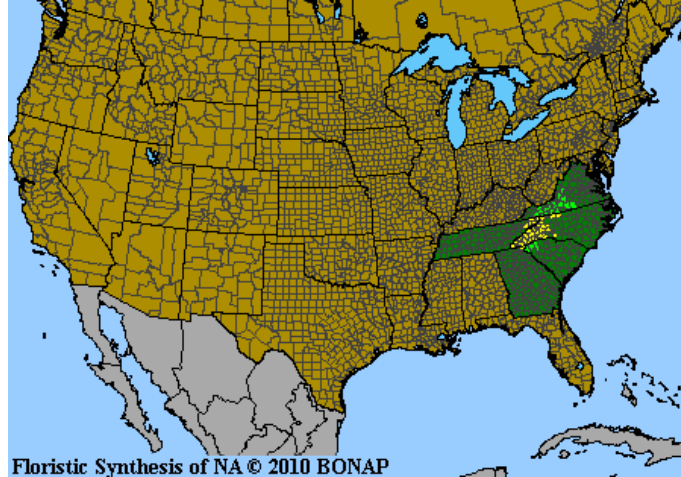
Comments: status: phenology: Blooms

Associates:

ethnobotany:

VHFS: Species is thought to be more closely related to ASIAN HEMLOCKS than to *T canadensis*.





*Tsuga caroliniana*

Line drawing courtesy of Kentucky Native Plant Society. Photos - USDA-NRCS PLANTS Database - Not copyrighted images. North America map courtesy of BONAP (2010)

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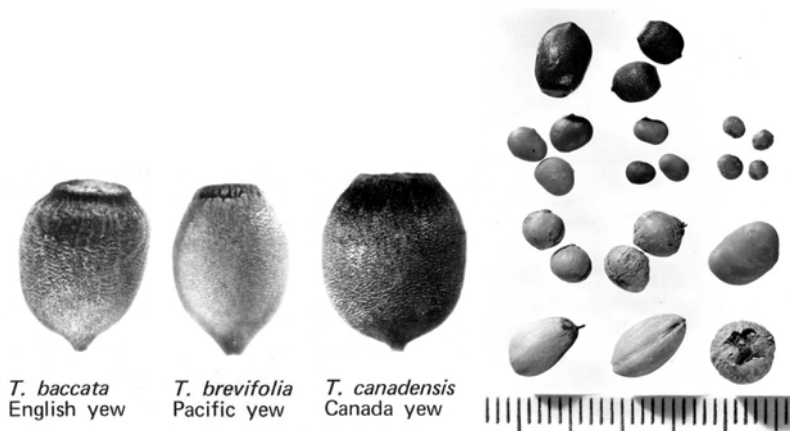
### TAXACEAE S.F. Gray 1821 YEW FAMILY

**TAXUS** Linnaeus 1753 **YEW, GRAVEYARD TREE** *Taxaceae* *Taxus* (TAX-us) from the Classic Latin or Greek name for yew. A genus of 8 “discouragingly similar” species of evergreen trees & shrubs of temperate regions of the Northern Hemisphere. (Hils fna 1993) ♂

In England, early Christian missionaries often held services under a yew, hoping to attract pagans, hence an association of the tree with churches & graveyards arose.

Thy fibres net the dreamless head  
 Thy roots are wrapt about the bones  
 Alfred, Lord Tennyson

Yews are also the source of the drug paclitaxel, or Taxol, used in fighting ovarian, breast, & lung cancer.



*Taxus*

Cone photo courtesy of USDA Forest Service USDA-NRCS PLANTS Database

**Taxus canadensis** Marshall (seen as *T canadensis* Weber) ☞ CANADA YEW, aka AMERICAN YEW, GROUND HEMLOCK, YEW, *Ne'bagandag'*, "it is one sided" (Ojibwa) (kan-a-DEN-sis) of Canada or NE USA.)

Habitat: Wooded hillsides, rich woods & thickets; rocky outcrops, wooded hillsides. distribution/range:

"Found in the north tier of cos west of Boone. In our co, it is on North & South Kinnikinnick Creeks & Hall Creek, in Stephenson Co on Rock Run & Cedar Creek, in Jo Daviess Co on Apple River & in Ogle Co on Pine Creek." (ewf55)

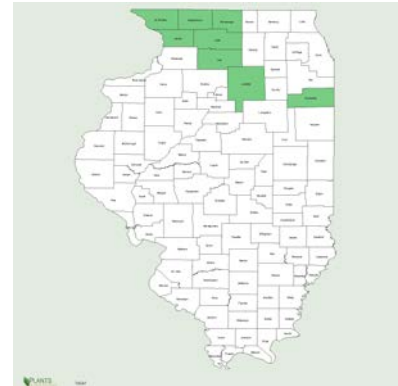
Culture: Difficult to transplant. B&B.

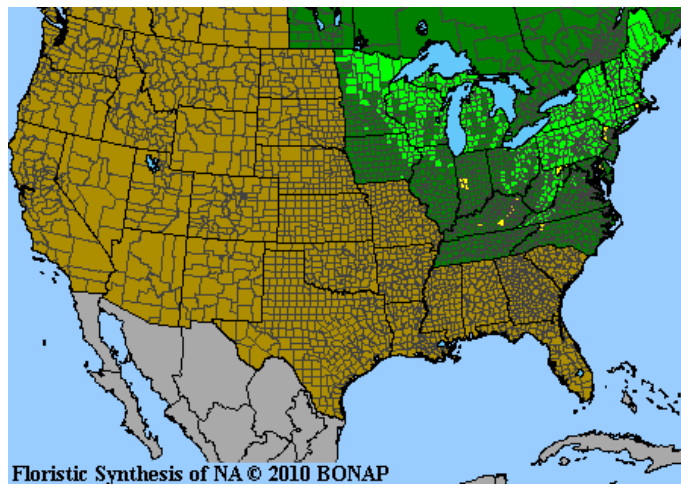
Description: Native, needle-leaf, evergreen shrub, 6'+, forms an attractive broad mound; flowers dioecious; fruit is fleshy, translucent, red berry-like cone, 0.38" diameter with one hard seed. The red fleshy portion of the fruit is an aril. key features: "Leaves are spirally arranged, twisted at base to form flat sprays; ovules are not in cones, but at tip of stalk covered with an aril-like (fleshy), bright orange-red covering at maturity." (Ilpin)

Comments: status: phenology: Blooms C3.

Associates: Wind pollinated. Attracts songbirds, upland gamebirds, but species is of moderate wildlife value. Deer eat the fruit, leaves, stems, & buds. No serious pest or disease problems.

ethnobotany: Used as a medicinal beverage by Ojibwa & Pottawatomie (Gilmore 1933, sm33). Menominee also used it for medicine. Ojibwa medicine for rheumatism (den28). One source says the berries/cones are edible. ☞ But, they are also said to be poisonous! Ilpin says the aril is edible, the seeds & wilted foliage are poisonous. A common scenario, an edible fruit with a poisonous seed makes great evolutionary sense. Mama *Taxus* wants an animal to eat the fruit, but not to chew the seed, instead depositing the cleaned, scarified seed in a pile of fresh fertilizer at a distance from the mother plant. This adaptive scheme is repeated many times in nature, as with AVOCADO, MAY APPLE, APPLES, ORANGES, & PLUMS.





Floristic Synthesis of NA © 2010 BONAP

*Taxus canadensis*

Line drawing courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst - USDA-NRCS PLANTS Database - Not copyrighted image. 2<sup>nd</sup> photo courtesy of USDA Forest Service USDA-NRCS PLANTS Database. Illinois map courtesy plants.usda.gov. North America map courtesy of BONAP (2010)

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**GINKGOACEAE** Engler in Engler & Prantl 1897 **GINKGO FAMILY** A monotypic family, one species native of China, possibly extinct in the wild. 6 genera are known as fossils.

**GINKGO** Linnaeus **GINKGO, MAIDENHAIR TREE** Japanese from Chinese *yin*, silver, & *hing*, apricot, or *yinhsing*, in reference to appearance of the seed. Older Chinese 銀果, silver fruit, pronounced as *yínguǒ* in Mandarin. Also spelled *gingko*, *gingo*, & *ginko*. Leaf blades broader than long, veins dichotomously branching. Pollen cones lax, elongate. Ovules often abscising before fertilization. Seeds 1-2 per peduncle, with odoriferous fleshy outer coats, inner coat hard, cotyledons 2-3. The genus is known from fossils dating back nearly 200 million years to the early Jurassic that are nearly identical to present-day trees. Related taxa are known from Permian fossils 270 million years.

This taxon tests (or teases) some rationales about what is native & what is not. *Ginkgo* once flourished in North America, but has been “locally” extinct for a few million years. It is now a popular street tree & landscape tree, & may be weakly naturalizing. In comparison, many camelids & the modern horse evolved in North American grasslands & faced local extinction about 11,000 years ago, yet no restorationist is restoring equine & camelid grazing to native grasslands. However, the *Bison* is precious & romantic (&tasty), even though it is a recent, *sans* green card, immigrant from Asia. So, what is native? There has to be a committee somewhere, & memos.



It is hard for some to grasp that during the Sangamon Interglacial & again in the late Wisconsinan Glacial, Illinois looked like the Serengeti, with elephants (keystone species), lions, cheetahs, horses, camels, bison, dire wolves, ground sloths, giant beavers, giant tortoises, glyptodonts, & very large, very fast bears. The ecology of our native species had been roughed-out through the Cenozoic, but it was fine tuned during the Pleistocene, but not necessarily by some recent species of Johnny-come-lately bovids. **Relate early ecological partners of following.**

***Ginkgo biloba*** Linnaeus GINKGO, aka GINKGO-NUT, GINKGO-TREE, MAIDENHAIR TREE,

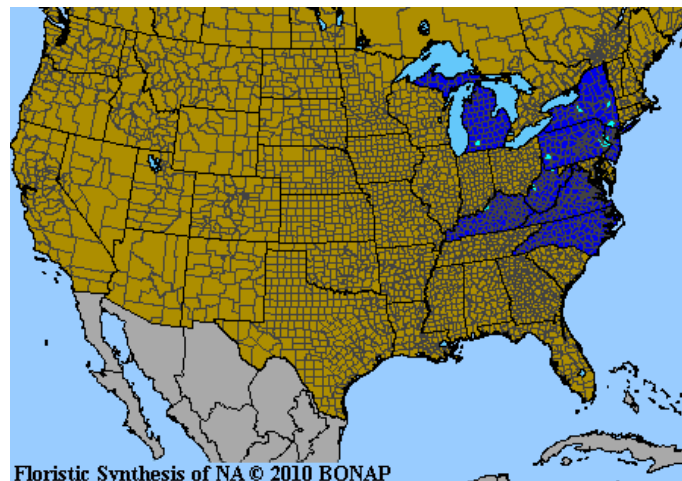
Habitat: Disturbed streamside habitats, streambanks & natural levees; also rocky slopes & cliff edges.

distribution/range: Frequently planted, rarely escaped to suburban woodlands & yards, doubtfully naturalized; native to se China, where it may be extinct as a wild plant. Possibly naturalized in Kentucky, Michigan, New York, North Carolina, Pennsylvania, Virginia, & West Virginia (bonap 2011). Apparently escaped from cultivation in DuPage Co (Wilhelm (2010) in m14).

Dioecious, male flowers & female flowers are on different trees. Most landscape specimens are selections of male trees. Some older plantings may have trees of both sexes. The ripe “fruit” is attractive, plum- or cherry-like, & has an objectionable odor, hence females are seldom planted, which may explain why the species infrequently escapes from cultivation & its “weakly naturalizing”. The ripe seed contains butanic acid & smells like rancid butter.

Several trees (4-6) growing within 1-2 km of the blast in Hiroshima survived & are alive today.

ethnobotany: The species is used herbally to improve something, but I just can’t remember what anymore.



*Ginkgo biloba*

North America map courtesy of BONAP (2010)  
The End ? of the Gymnosperm Section

Endnotes & abbreviations. The following math functions violate Abbey's 1<sup>st</sup> Law, which see.

++ The listed numbers are seed count mean, seed count median, seed count mode, seed count standard deviation, seed count max, seed count min, seed count range.

\*\* The listed numbers are Germ mean, germ median, germ mode, germ standard deviation, germ range (range); Dorm mean, dorm median, dorm mode, dorm standard deviation, dorm range (range); Test mean, test median, test mode, test range. (#germ test : tz etc)

Reference abbreviations May 04 2014

CEPPC California Exotic Pest Plant Council  
CIPC California Invasive Plant Council  
SEPPC Southeast Exotic Pest Plant Council  
SWSS Southern Weed Science Society  
RBG Kew RBG Kew, Wakehurst Place  
aes10 (AES 2010)  
afvp (Atlas of Florida Vascular Plants)  
anef (Angelo & Boufford: Atlas of New England flora)  
apl (Applewood)  
asfg (Audubon Society Field Guide)  
wade (Alan Wade, nd, various years, 95, &c)  
bsh (Baker Seed Herbarium, California)  
bb02 (Baskin & Baskin 2002, 2001, &c.)  
nlb05 Britton 1905  
cb03 (CC Baskin 2003, 2001, &c.)  
crfg California Rare Fruit Growers  
csvd (Currah, Smreciu, & Van Dyk 1983)  
tchn tomclothier.hort.net (-4°C 24°F stratification being corrected)  
cu00 (or cu02, &c, Cullina 2000, 2002, 2008)  
nd91 (Norm Deno, 1991, 1993)  
den28 (Densmore 1928)  
do63 (Dobbs 1963)  
mfd93 (Mary Fisher Dunham 1993)  
dh87 (Dirr & Heusser 1987)  
drwfp (Directory of Resources on Wildflower Propagation)  
ecs (Ernst Conservation Seeds catalog)  
ew12 (Everwilde 2012) also ew11  
ewf55 (Egbert W Fell 1955)  
ewf59 (Egbert W Fell 1959)  
fh (Robert W Freckmann Herbarium)  
fna (Flora of North America project)  
foc (Flora of China online)  
fop (Flora of Pakistan online)  
gni (Genesis Nursery, Inc)  
gc63 (Gleason & Cronquist 1963, 1991)  
gran (Granite Seeds)  
he99 (Heon et al 1999)  
hk83 (Hartman & Kester 1983)  
hpi (Hill Prairies of Illinois  
(Hilty website)  
Ilpin (Illinois Plant Information network)

jf55 (Jones & Fuller 1955)  
jlh (JL Hudson, Seedsman, (if the phone doesn't ring its me))  
kpw (Kansas Prairie Wildflowers)  
krr (Kenneth R Robertson)  
lbj (Lady Bird Johnson Wildflower Center Native Plant Information Network)  
m14 (Mohlenbrock 2014) also m86, m99, m02, m05, m06, &c  
mbg (Missouri Botanic Garden)  
msue (Michigan State University Extension)  
nae Native American Ethnobotany (Moerman, University of Michigan Dearborn)  
now36 (Nowosad et al 1936)  
nyfa (New York Flora Atlas)  
orghp (Ontario Rock Garden Hardy Plant Society)  
ppc (Philips Petroleum Company)  
pots (Plants of the Southwest 2000)  
pm09 (Prairie Moon 2009) also pm02, pm11, &c  
pnnd (Prairie Nursery no date)  
pph (Prairie Propagation Handbook)  
ppi (Prairie Plants of Illinois)  
psdg (Plants of South Dakota Grasslands)  
pug13 (plants.usda.gov accessed 2013, 2014)  
oed Oxford English Dictionary online  
rain (Ranier Seeds)  
rrn97 (Reeseville Ridge Nursery 1997)  
rvw11 (Reznicek et al 2011)  
rs ma (Ray Schulenburg Morton Arboretum)  
rhs Royal Horticultural Society  
sh94 (Shirley Shirley 1994) & don't call me Shirley  
sk08 (Stuppy & Kessler 2008)  
sm23 (Smith 1923) also sm32, sm33, sm28, &c.  
sw79 (Swink & Wilhelm 1979)  
sw94 (Swink & Wilhelm 1994)  
tlp (Time Life Perennials)  
tlw (Time Life Wildflowers)  
tpg The Prairie Garden  
uconn (UConn Plant Database)  
us97 (USDA 1997)  
w12b (Weakley Nov 2012 ) also w07-12  
wfatp (Vance & Vance 1979)  
wfn (Wildflowers of Nebraska)  
wfnp (Wildflowers Northern Prairies)  
ws92 (Wilhelm & Swink 1992)  
w73 (Alphonso Wood 1873)  
ry64 (Richard Yarnell 1964)  
yy92 (Young & Young 1992)

*Reliquum etiam non scriptum est.*