Dichotomous Key to Gymnosperms of Wisconsin

(Compiled by Tim Gerber/UW-La Crosse)

Fifteen species (excluding hybrids) make up the Gymnosperm flora of Wisconsin (Wetter et al., 2001). This key includes native and two introduced species found growing or at least persisting and spreading in the wild. Although other gymnosperms can grow in Wisconsin (e.g., Ginkgo), they are usually planted and have not escaped cultivation. This key relies on features found in Flora of North America (1993), Voss (1972), and Gleason & Cronquist (1991); nomenclature follows Wetter et al. (2001). Gymnosperm groups included here are Yew (*Taxus*), Arborvitae (*Thuja*), Junipers (*Juniperus*), Larch (*Larix*), Pines (*Pinus*), Fir (*Abies*), Hemlock (*Tsuga*), and Spruces (*Picea*) . Wetland indicator status for those species indicated follows USFWS (1988), Region 3. [Note: This document should not be used to officially determine or assign a wetland indicator status.]

1	Leaves needle-like spreading in one plane ("2-ranked") except on erect shoots, without resin ducts/ fruit-like (green to red) fleshy aril with 1 seed. **FACW-**	*Taxus canadensis*
1	Leaves needles, awls or scales some 2-ranked but most not, with or without resin ducts/ woody or fleshy cones (green to bluish) with 1 to many seeds	2
2(1)	Leaves needles or scales, alternate, opposite or whorled, persistent on branchlets (but most branchlets shed with age)/ cone scales valvate or imbricate (if imbricate then leaves opposite and scales), seeds 1 – 20 per scale	3
2	Leaves needles, alternate or fascicled, individually abscising from branchlets when shed (except that fascicles in *Pinus* are shed as units)/ cone scales imbricate, seeds 2 per scale	6
3(2)	Leaves scales, opposite and appressed, dimorphic (some scales keeled, some flat)/ mature female cones 8 – 15 mm long, brown, ± woody, elongate scales distinct// plant a tree. **FACW**	*Thuja occidentalis*
3	Leaves needles, awls or if scales and appressed then not keeled/ mature female cone ≤ 8 (10) mm long, green or bluish, fleshy and berry-like// plant a tree with needles or a shrub	4
4(3)	Leaves all awls in whorls of 3, articulated at base, not decurrent/ cones on very short, scale covered peduncles in axils of leaves	*Juniperus communis*
4	Leaves mostly scales, opposite or if awls present often whorled but not articulated, decurrent at base/ cones apparently terminal on short, scale-covered peduncles or branchlets	5
5(4)	Cone on ± straight ascending peduncles or branchlets// plant an erect, small tree. **FACU**	*Juniperus viriginiana*
5	Cone usually on ± arched or recurved peduncles// plant a prostrate trailing shrub. **FAC-**	*Juniperus horizontalis*

6(2)	Leaves (needles) in clusters of 10 – 60 on short (spur) shoots, clusters not scaly-sheathed **or** leaves on year-old and older branches borne either in clusters (fascicles) of 2 – 5(– 6), each cluster scaly-sheathed at base at least when young;	7
6	Leaves borne singly along branches, not scaly-sheathed at base or, if so when young, then terete;	11
7(6)	Leaves in clusters of 10 – 60 on short (spur) shoots, clusters not scaly-sheathed; deciduous in winter; female cones < 2 cm long. **FACW**	*Larix laricina*
7	Leaves in fascicles of 2 – 5(6), not on spur shoots, each cluster scaly-sheathed at base; evergreen; female cones > 2 cm long	8
8(7)	Needles in fascicles of 5. **FACU**	*Pinus strobus*
8	Needles in fascicles of 2	9
9(8)	Longer needles of healthy branches 10 – 15 cm or more, fresh needles somewhat brittle and breaking cleanly in middle when bent/ FACU	*Pinus resinosa*
9	Longer needles of healthy branches	10
10(9)	Seed cones mostly asymmetric, variable serotinous, bark brown, native. **FACU**	*Pinus banksiana*
10	Seed cones mostly symmetric, not serotinous, bark on upper sections of trunk orange and flaky, Introduced , naturalized, ecologically invasive	*Pinus sylvestris*
11(6)	Leaves persistent on dry branches, sessile, separating cleanly from an orbicular leaf-scar without any raised projection leaving stem smooth/ female cones erect, 3.5 – 6.5 cm long, scales falling at maturity from persistent central axis. **FACW**	*Abies balsamea*
11	Leaves readily falling from dry branches, leaving persistent peg-like bases (sterigmata) leaving stem rough/ female cones pendulous (1) 1.3 – 6 cm long, falling entirely at maturity	12
12(11)	Leaves flattened, round at apex, distinctly short stalked on narrow sterigmata. **FACU**	*Tsuga canadensis*
12	Leaves $\underline{+}$ 4 sided, acute or sharp-pointed, sessile on sterigmata	13
13(12)	Twigs pubescent/ female cone scales usually fan-shaped, broadest at apex, 2.3 – 4.5 (5) cm long. **FACW**	*Picea mariana*
13	Twigs mostly glabrous/ female cone scales usually $\underline{+}$ diamond-shaped or elliptic, broadest at apex or middle, (2.5) 3 – 16 cm long	14
14(13)	Leaves 1 – 2.5 cm, blunt-tipped/ seed cones (10) 12 – 16 cm// Introduced, persisting and spreading species in WI & US	*Picea abies*
14	Leaves (0.8) 1.5 – 2 (2.5) cm, mostly sharp-pointed/ seed cones 2.5 – 11 (12)// native species. **FACU**	*Picea glauca*

Bibliography/References:

Flora of North America Editorial Committee. 1993. Flora of North America, Vol 2: Pteridophytes and Gymnosperms. (see also FNA Online http://www.efloras.org/flora_page.aspx?flora_id=1)

Gleason & Cronquist. 1991. 2nd ed. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. New York Botanical Garden.

Voss, E. 1972. Michigan Flora: Part I. Gymnosperms and Monocots. Cranbrook Institute of Science and U. of MI Herbarium

US Fish & Wildlife Service (USFWS). 1988. National List of Plant Species that Occur in Wetlands: Wisconsin (Region 3 indicators)

Wetter, M., et al. 2001. Checklist of the Vascular Plants of Wisconsin. Technical Bulletin #192. (see also WI State Herbarium http://www.botany.wisc.edu/wisflora/)