Pinophyta - Gymnosperms

Seed bearing plants without flowers and pistils – Gymno-sperm = "naked seeds"

Gymn-asmium = “naked house”

3 families of conifers only in Great Lakes region with 8 genera and 13 species
- Cupressaceae - junipers
- Pinaceae - pines, spruces
- Taxaceae - yews

Visit Wilderness State Park in Michigan to see all 13 native gymnosperms from one spot
Pinophyta - Gymnosperms

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Ginkgo (China) often planted in Great Lakes region

Pinophyta - Gymnosperms

- Less diverse than ferns: 12 families, 80 genera, 820 species
- Woody: trees, shrubs, lianas, few epiphytes
- Worldwide, but more dominant in colder and arctic regions

General characteristics:

- Seeds!
- = mature ovule
- "naked seed" in cone
- No water required for sperm movement - pollen
- = male gametophyte (heterosporous!)
- pollinated by wind (mostly)

Good books!

A Natural History of Conifers

Michigan Trees
Pinophyta - Gymnosperms

Cupressaceae: cypress family

Leaves needle or scale-like
Opposite or whorled, persistant
Important rot resistant trees (redwood, cedar)

Thuja occidentalis
Arbor vitae, White cedar
Leaves opposite in 4 ranks and heteromorphic
Branches flattened
Small woody cones

Juniperus
Junipers, Red cedar
Leaves closely appressed; can be scale-like or awl-like
Branches not flattened
Blue "berry" cones

South Manitou Island
(Sleeping Bear National Lakeshore)

Valley of the Giants
Pinophyta - Gymnosperms

Cupressaceae: cypress family

Juniperus virginiana
Red cedar

Juniperus communis
Common juniper

Juniperus horizontalis
Creeping juniper

Pinophyta - Gymnosperms

Taxaceae: yew family

Leaves needle-like, spreading in one plane - 2 ranked
No cones, single seed in fleshy aril, but seeds naked
1 genus Taxus; taxol drug from western T. brevifolia

Taxus canadensis
American yew
Ground hemlock

Apostle Islands stand with no deer

Taxus cuspidata
Japanese yew

Pinaceae: pine family

6 genera, 200 species of Northern Hemisphere
Foliage leaves needle-like, alternate or fascicled
Many seeds enclosed in fleshy to woody cone, with conspicuous cone scales

Pinus strobus
White pine

Alleghenian element
Pinophyta - Gymnosperms

Pinaceae: pine family

Pinus resinosa - Red pine
- more xeric than white pine

Pinus banksiana - Jack pine
- most xeric of the pines
- showing serotinous cones

Pinus banksiana - Jack pine
- Keystone species involving glacial geology, jack pine bud worm, defoliation, fire, serotinous cones, endangered Kirtland’s warbler, and parasitic cowbird

7 year old jack pine site – Crawford Co. MI

“sand counties” due to glacial melt off
Endangered Kirtland’s Warbler basically restricted to these sand counties in MI and to young stands of jack pine & now moving into central WI.

Jack pine bud worm infestations allow fire and cyclical formation of new stands of jack pine.

Parasitic cowbird (and suppression of fire) almost caused the Kirtland’s warbler go extinct.

- **Abies balsamea**
  - Balsam fir

- **Larix laricina**
  - Larch, tamarack

- **Picea glauca**
  - White spruce

- **Picea mariana**
  - Black spruce

- **Tsuga canadensis**
  - Eastern hemlock