

**THE GYMNOSPERMS OF OHIO.**

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Ohio lies south of the great northern conifer belt of North America and since there are no mountains in the state, the Gymnosperms do not constitute an important part of the flora. There are but 11 species, one of which is probably accidental and has been reported from but one county. The only species of general distribution is the Red Juniper, but species of *Pinus*, *Picea*, *Abies*, and other genera are quite commonly cultivated in all parts of the state.

Subkingdom, GYMNOSPERMAE. Gymnosperms. 500 living species.

Plants in which the sporophytes are woody perennials with open carpels (megasporophylls) without a stigma, and hence with naked ovules and seeds, the pollen (male gametophyte) falling directly on the micropyle of the ovule (megasporangium); flowers monosporangiate, usually developing as cones but sometimes very simple; female gametophyte with numerous cells but without polar cells and thus without true endosperm as in the Angiosperms; male cells usually two, either nonmotile sperms or developed as spirally coiled multiciliate spermatozoids.

KEY TO THE NATIVE AND CULTIVATED GENERA.

1. Foliage leaves needle-shaped, narrowly linear, subulate, or scale-like; conifers, or in one case a dicotyl with delicate twigs and minute leaves. . . . . 2
1. Foliage leaves fan-shaped with dichotomous venation, a number on thick, wart-like, persistent dwarf branches. . . . . **Ginkgo.**
2. Without dwarf branches. . . . . 4
2. With typical dwarf branches, persistent for more than 1 year. . . . . 3
2. With feather-like dwarf branches, deciduous each year, the linear leaves spreading into 2 ranks. . . . . **Taxodium.**
2. With delicate spray-like twigs deciduous each year; leaves scale-like, minute; a dicotyl. . . . . **Tamarix.**
3. Dwarf branches small, self-pruned, with 2-5 foliage leaves. . . . . **Pinus.**
3. Dwarf branches thick, wart-like, persistent, with numerous deciduous leaves . . . . . **Larix.**
4. Leaf buds scaly; leaves scattered. . . . . 5
4. Leaf buds not scaly, naked; leaves opposite or whorled. . . . . 7
5. Leaf scar on a sterigma, the twigs covered with scales representing the leaf bases. . . . . 6
5. Leaf scar on the bark; twigs without scales; leaves flat. . . . . **Abies.**
6. Leaves flat, those on the upper side of the twig much shorter than the lateral ones; trees. . . . . **Tsuga.**

6. Leaves flat all of about the same length; ours a shrub.....**Taxus.**  
 6. Leaves more or less 4-sided, spreading in all directions.....**Picea.**  
 7. Twigs decidedly flattened and fan-like, the leaves small, scale-like, and appressed, of two types, the dorsal and ventral broader and more abrupt at the apex; scales of the carpellate cone not peltate.  
**Thuja.**  
 7. Twigs little or not at all flattened, the leaves either scale-like, appressed, and nearly or quite similar, or subulate and spreading; fruit berry-like when ripe or the scales of the carpellate cone peltate..... 8  
 8. Leaves all subulate and spreading; or partly scale-like, 4-ranked and appressed; carpellate cone developing into a bluish-black berry-like fruit. (Retinispora forms of Thuja might be sought for here also)..... **Juniperus.**  
 8. Leaves all small, scale-like, appressed, nearly or quite similar; fruit a dry cone..... 9  
 9. Scales of the carpellate cone several-seeded..... **Cupressus**  
 9. Scales of the carpellate cone 2-seeded.....**Chamaecyparis.**

#### Class, CONIFERAE. Conifers. 350 species.

Sporophytes developing as shrubs or large trees, much branched, with or without dwarf branches; stems with a normal cambium, no vessels in the secondary wood, resin nearly always present; leaves mostly small, entire, linear, lanceolate, subulate, or scale-like; flowers monosporangiate, monoecious or dioecious; seeds and female gametophyte rather small, ovules without pollen-chamber, cotyledons 2-15, always free; sperm cells 2, not motile, no cilia being present.

#### Order, PINALES.

Conifers with both the stamens (microsporophylls) and carpels (megasporophylls) in cones, usually numerous.

#### Pinaceae, Pine Family.

Leaf-buds scaly; carpels of the cone numerous, with two inverted ovules on the ovuliferous scale; stamens with two microsporangia.

#### Pinus L. Pine.

Resinous evergreen trees with small dwarf branches bearing 2-5, narrow foliage leaves; dwarf branches and ordinary twigs covered with scale leaves. Dwarf branches self-pruned after a number of years. Carpellate cones woody, with numerous carpels. Important lumber and turpentine trees.

1. Dwarf branches with 5 foliage leaves; ovuliferous scales little thickened at the tip..... **P. strobus.**  
 1. Dwarf branches with 2-3 foliage leaves; ovuliferous scales much thickened at the tip..... 2  
 2. Dwarf branches with 3 foliage leaves, rarely 2 or 4, the leaves 3-5 in. long; carpellate cones ovoid.....**P. rigida**  
 2. Dwarf branches normally with 2 foliage leaves..... 3  
 3. Twigs glaucous; leaves slender,  $2\frac{1}{2}$ -5 in. long; buds not very resinous; prickles of the ovuliferous scales short and small... **P. echinata.**  
 3. Twigs glaucous; leaves stout,  $1\frac{1}{2}$ - $2\frac{1}{2}$  in. long; buds very resinous; prickles of the ovuliferous scales long and stout.... **P. virginiana.**

1. ***Pinus strobus*** L. White Pine. A large tree with nearly smooth bark, except when old; branches horizontal, in whorls. Often forming dense forests. Wood soft and straight-grained. One of the most valuable timber trees in the world. Northeastern part of Ohio to Erie County.

2. ***Pinus virginiana*** Mill. Scrub Pine. A slender, usually small tree with spreading or drooping branches; the old bark flaky and dark-colored. Wood very resinous, soft and durable, but of poor quality. In sandy soil. From Fairfield County southward.

3. ***Pinus echinata*** Mill. Yellow Pine. A large tree with spreading branches; leaves sometimes in 3's. Wood rather hard and very valuable; much used as lumber. Produces shoots from stumps. In sandy soil. Probably accidental in Ohio; Auglaize County.

4. ***Pinus rigida*** Mill. Pitch Pine. A tree with spreading branches, the old bark rough and furrowed, flaky in strips. Sprouts readily from the stump if cut down or burned. Wood rather hard and brittle and full of resin; used for fuel, charcoal and coarse lumber. A source of turpentine to a limited extent. In dry sandy or rocky soil. Scioto, Jackson and Fairfield Counties.

#### ***Larix*** Adans. Larch.

Tall pyramidal trees with horizontal or ascending branches and with clusters of narrowly linear, deciduous leaves on thick wart-like dwarf branches. Carpellate cones woody, with numerous carpels,

1. ***Larix laricina*** (DuR.) Koch. Tamarack. A slender tree with close or at length scaly bark. Wood hard, durable and very strong. Carpellate cones reddish purple when young. In bogs, swamps, and about the margins of lakes. Northern third of the state.

#### ***Tsuga*** Carr. Hemlock.

Evergreen trees with slender horizontal or drooping branches. Leaves flat, narrowly linear, spreading more or less into 2 ranks. Leaf scars on short sterigmata. Carpellate cones pendulous.

1. ***Tsuga canadensis*** (L.) Carr. Hemlock. A tall tree with slender, horizontal or drooping branches, the old bark flaky in scales. Wood very coarse. Self-prunes twigs. Eastern half of Ohio, and occasional toward the west.

#### **Juniperaceae.** Juniper Family.

Leaf-buds naked; carpels of the cone few, opposite; stamens with 3-8 microsporangia.

#### ***Thuja*** L. Arborvitae.

Evergreen trees or shrubs with flattened fan-like twigs. Carpellate cones ovoid or oblong with dry coriaceous scales, not peltate.

1. **Thuja occidentalis** L. Arborvitae. Usually a small, conical tree with fan-like branches. Self-prunes twigs. Wood light and durable. Usually in wet soil and along the banks of streams. Champaign, Franklin, Greene, Highland and Adams Counties.

### **Juniperus** L. Juniper.

Evergreen trees or shrubs with small globose, berry-like bluish or blackish cones.

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| 1. Leaves all subulate, prickly pointed, verticillate; cones axillary. . . . .                   | 2                     |
| 1. Leaves of 2 kinds, scale-like and subulate, opposite or verticillate; cones terminal. . . . . | <b>J. virginiana.</b> |
| 2. Erect trees or shrubs; leaves slender, mostly straight. . . . .                               | <b>J. communis.</b>   |
| 2. Low depressed shrubs; leaves stouter, mostly curved. . . . .                                  | <b>J. nana.</b>       |

1. **Juniperus communis** L. Common Juniper. A low tree with spreading or drooping branches and shreddy bark. Goats are poisoned from eating the leaves. On dry hills. In the northern part of Ohio, as far south as Fairfield County.

2. **Juniperus nana** Willd. Low Juniper. A depressed rigid shrub usually with creeping radiating branches, the ends erect or ascending, thus forming circular patches. In dry open places. Cedar Point, Erie County.

3. **Juniperus virginiana** L. Red Juniper. A tree with spreading, often irregular branches, when old, but conic in shape when young. Self-prunes twigs. Wood very valuable, light, straight-grained, durable and fragrant; used almost exclusively in the manufacture of lead pencils. Often infested with the "cedar-apple" fungus. Poisonous to goats. Common on hills and bluffs; general in Ohio.

### Order, TAXALES.

Conifers with the stamens (microsporophylls) in cones, but the carpels (megasporophylls) mostly single; ours with a red fleshy disk surrounding the ripe seed.

### **Taxaceae**, Yew Family.

Staminate (microsporangiate) cone with 3-5 stamens; carpels solitary with one or two erect ovules.

### **Taxus** L. Yew.

Evergreen trees or shrubs without resin, with spirally arranged, short petioled, linear, flat leaves spreading into 2 ranks. Fruit with a bony seed surrounded by a fleshy red disk.

1. **Taxus canadensis** Marsh. American Yew. A low, usually straggling shrub with linear leaves green on both sides. The leaves are supposed to be poisonous to stock. On rocky banks and in woods. Northern Ohio, as far south as Fairfield and Greene Counties.