

Pinaceae Lindley (Pine Family)

Trees (occasionally shrubs), often emitting strong fragrances from bark and/or leaves; resin canals present in wood and leaves. Branches whorled or opposite (rarely alternate). Leaves simple, *linear to needlelike* (rarely narrowly ovate), alternate but often appearing 2-ranked by twisting of leaf base to bring most of the leaves into one plane, clustered or fascicled in groups of 2 to 5 in *Pinus*, sessile or short-petioled, on long shoots or tightly clustered on short shoots, persistent (deciduous in *Larix* and *Pseudolarix*). Monoecious. Microsporangiate strobili with spirally arranged, bilaterally symmetrical microsporophylls; microsporangia 2 on the abaxial microsporophyll surface; pollen grains with 2 saccae (saccae absent in *Larix*, *Pseudotsuga*, and all but two species of *Tsuga*) and 2 prothallial cells. *Cones with spirally arranged, flattened bract-scale complexes*; scales persistent (deciduous in *Abies*, *Cedrus*, and *Pseudolarix*), bracts free from the scale, longer than the cone scale to much shorter than the cone scale; maturing in 1-2 years; ovules 2, inverted (micropyle directed toward the cone axis), on the adaxial cone scale surface; archegonia few per ovule, not clustered. Seeds with a long, terminal wing derived from tissue of the cone scale (wing reduced or absent in some species of *Pinus*); embryo straight, cotyledons 2-18 (Figure 7.16).

Distribution and ecology: Pinaceae are almost entirely limited to the Northern Hemisphere. Three or four genera grow only in eastern Asia; one (*Cedrus*) is confined to North Africa, the Near East, Cyprus, and the Himalayas; and the remaining six genera (the major genera) all occur widely in the Northern Hemisphere. The family ranges from warm temperate climates to the limit of tree growth above the Arctic Circle, from permanently water-saturated soils to well-drained soils, and from sea level to alpine habitats up to 4800 m above sea level in eastern Tibet. The seeds of pines are primary components of the diets of many species of birds, squirrels, chipmunks, and other rodents. Members of the family provide cover for many wildlife species and are important in watershed protection.

Genera/species: 10/220. *Major genera:* *Pinus* (100 spp.), *Abies* (40), *Picea* (40), *Larix* (10), *Tsuga* (10), and *Pseudotsuga* (ca. 5).

Economic plants and products: Pinaceae are one of the leading sources of timber in the world. The wood of pines (*Pinus*), Douglas firs (*Pseudotsuga*), spruces (*Picea*), hemlocks (*Tsuga*), larches (*Larix*), and firs (*Abies*) is used extensively for construction, pulp for paper production, fenceposts, telephone poles, furniture, interior trim for houses, musical instruments, woodenware, and numerous other purposes. Pines, spruces, hemlocks, cedars (*Cedrus*), Douglas firs, and firs are used extensively as ornamentals, and hundreds of cultivars have been developed in many of the species of these genera. Pine "nuts," the more or less wingless seeds of piñon pines of southwestern North America, were a staple of native North Americans. These seeds and those of some Old World groups of pines are now a gourmet food. Rosin and turpentine are extracted from various species of pines.