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ABSTRACT

Conifers (Pinophyta) are woody trees or shrubs with simple leaves, simple pollen cones, and compound or reduced ovulate cones. Despite their dominance in many terrestrial landscapes, the 670 species of extant conifers make up less than 0.3% of the species diversity of modern land plants. The fossil record of conifers, which extends to the Carboniferous, indicates that a much greater diversity is now extinct. Conifers occur on six of the seven continents and include both widely distributed, dominant species that form vast forests and narrow endemics. They rank as the largest, tallest, and longest living non-clonal terrestrial organisms on the Earth. *Pinus* is the largest extant genus with approximately 20 species distributed throughout the Northern Hemisphere. It is rivaled in diversity in the Southern Hemisphere and the tropics by *Podocarpus*, with approximately 105 species. Genetic diversity is often high in conifers, promoted by large population size, outcrossing reproductive systems, high mutation rates, and long distance dispersal of pollen and sometimes seeds. Estimates of ages and mutation rates in the group are expected to improve greatly as conceptual advances related to fossil interpretation converge with the enormous quantities of new sequence data being generated by genetic and phylogenetic studies of living species. Contrasting patterns of organellar and nuclear inheritance make conifers an important system for studying pollen and seed flow, hybridization, lineage sorting, and gene coalescence.