
Pines are, arguably, our most important trees in the northern hemisphere. They provide us with wood for fuel, furniture, and housing; fiber for paper; and, in many areas, food in the form of nutritious seeds. Ecologically, pines are major components of many of the forested ecosystems of North America, Europe, and Asia. While naturally restricted to the northern hemisphere (crossing the equator only in Sumatra), pines are now-through human efforts-gaining ecological and economic importance in the southern hemisphere as well. Despite being a relatively small genus (this work recognizes 111 species), their importance has stimulated a large body of research: Richardson cites the figure of over 68,000 references regarding pines.

Ecology and Biogeography of Pinus is a monumental, and successful, effort on the part of 40 contributing authors—and one brave editor—to condense this tremendous body of literature into one text. This book provides an in-depth review of several decades of pine research presented in twenty-two chapters divided into the following six parts: Introduction; Evolution, Phylogeny and Systematics; Historical Biogeography; Macroecology and Recent Biogeography; Ecological Themes; and Pines and Humans. (Not since Mirov’s seminal work, The Genus Pinus (1967), has anyone tackled a comprehensive overview of the biology of pines; since then, much progress has been made in the study of pine ecology and some of Mirov’s work has fallen out-of-date.) The introductory chapter outlines the theme of the book and presents the general topics to be covered.

The second part, composed of two chapters, is the systematic focus of Ecology and Biogeography of Pinus. The lack of species level phylogenetic reconstructions, taxonomic disagreement, and a fragmentary fossil record create formidable topics that are handled well by the authors. Chapter Two—Phylogeny and Systematics—by Price, Liston and Strauss is an excellent overview of the field of pine taxonomy and systematics. The authors briefly review most of the techniques (e.g., morphology, cytology, chemistry, and DNA analysis) that have been used in the past or are currently being used to subdivide the genus and test evolutionary hypotheses. The traditional division of Pinus into two subgenera is well supported by anatomical, morphological and genetic data—the white or soft, haploxylon pines comprising subgenus Strobus and the yellow or hard, diploxylon pines in the subgenus Pinus. Further subdivisions of the genus to recognize presumed groups of relatedness have been made by many authors, emphasizing various lines of evidence. (Table 2.2 presents a useful comparison of several of these schemes.) One of the most widely accepted schemes is that of Little and Critchfield (1969), on which the authors base their updated taxonomic subdivisions. Many of the subsections are well delineated by multiple data sets, but several others remain ambiguous and relationships between/among the subsections is often unclear (e.g., composition of subsections Centrodies, Rzedowskianae, Ponderosa, and Oocarpae and relationships of the subdivisions of subgenus Strobus).

In the third chapter—Early Evolution of Pines—Millar sets the stage for the rest of the book. (Because the fossil record is crucial in inferring evolutionary histories, one wonders why this chapter did not come first.) The early paleobotanical record of pines is important in examining phylogenetic relationships and explaining the current diversity and distribution of pines. Millar presents an informative summary and analysis of the fossil record of Pinus. Much has changed since Mirov (1967) proposed a late Paleozoic, circumpolar origin for pines. Rigorous re-evaluation of fossil pines has amended this date to the “early-middle Mesozoic,” with the earliest pine fossil being the ~130-million-year-old early Cretaceous P. belica from Belgium. Recent fossil locations indicate a middle latitude origin in Laurasia or possibly eastern Asia. Advances in paleoclimatology, paleobotany, and plate tectonics have shed new light on the important events of the Eocene in the evolutionary history of Pinus, especially pine persistence in refugia in the Rocky Mountains of North America, and its subsequent reoccupation of much of western North America following the Eocene. This chapter also serves to point out the need for more paleobotanical research, especially filling in temporal and spatial gaps in the fossil record; i.e., there are no records of Pinus from the Paleocene. This chapter provides an excellent, and accessible, updated synopsis of the early evolutionary history and distribution of pines based on recent analyses of the fossil record.

Systematically, the biggest shortcoming of this book is the lack of a key to pine species. The most recent attempt is Dal limore and Jackson’s (1966) key in their horticulturally based book, but it is out-of-date. The last systematic treatments of Pinus were Shaw’s The Genus Pinus (1914) and Gaussen’s (1960) monograph; Shaw only recognized 66 species within his broad species concept and Gaussen’s taxonomy is not supported by modern studies. Additionally, Gaussen’s work is somewhat unavailable to English-speaking researchers. Researchers will have to continue to depend on local floras (e.g., Gaussen et al. 1993; Kral 1993; Farjon and Styles 1997, Wu and Raven 1999) for keys to pine species and distribution maps. Undoubtedly, the taxonomy of Pinus will continue to fluctuate as modern studies re-evaluate species and their relationships, and some researchers will disagree with the current treatment of species presented in this book.

The strength of this book lies in its ecology and biogeography sections, treating pine systematics as part of that whole. The third section, Historical Biogeography, is a Quaternary history of pines around the world derived mainly from fossil pollen studies. In this section, Perry, Graham and Richardson present interesting speculations on the evolutionary history of the diverse Mexican and Central American pines. Their chapter is a useful review of the available fossil evidence (almost exclusively palynological) and serves to point out how little is known about the evolution of this assemblage of incredibly diverse pines. The fourth section, Ma-