

SITE FACTORS, DISTURBANCES, AND THE DISTRIBUTION OF OAKS

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Oaks (*Quercus* spp.) are widely distributed, with more than 400 species worldwide, including 20 species in Europe, 100 species in North America, and 150 species in Central and South America. They are economically, ecologically, and culturally important throughout their range. Most oaks share traits causing them to be more abundant on relatively dry or frequently disturbed sites. These traits are most expressed by young oaks during regeneration and include moderate shade tolerance, slow juvenile shoot growth rate, large root system with abundant carbohydrate stores, and reliance on advance reproduction. These traits enable rapid recovery and resprouting after topkill from drought, fire, or browsing but also cause young oaks to grow slowly and succumb to competition on high-quality sites favoring shade tolerant or faster-growing competitors. Associations between site and oak regeneration strategies, stand development patterns, and oak abundance have long been recognized but recent advances in data availability through the U.S. Department of Agriculture, Forest Service, Forest Inventory Analysis (FIA) program and the Soil Survey Geographic Database allow relationships between site characteristics and oaks to be examined quantitatively. We examined the relationships between site factors, disturbance patterns, and abundance of oaks worldwide and discuss different approaches to modeling oak abundance, oak site suitability, and regeneration potential in the Eastern United States by using FIA and site data.

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