The Evolution and Occurrence of Compound Leaves in Magnoliophyta

A Comparative Study on the Effects of Evolutionary Optimization in the Eastern United States

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ABSTRACT - Variation in leaf structure among flowering plants, the angiosperms or *Magnoliophyta*, has generally manifested as a strategic adaptation utilized to optimize a species for its environment. While a preponderance of data have been assembled regarding various functional structures and leaf characters, no consensus exists regarding the divide between simple and compound leaf structures. This study looks to address key effects produced by compound leaves by sampling 10 common flowering plant species found growing in the eastern United States. Each species was examined for its growth rate, herbivory resistance, successional status, shade intolerance, and drought tolerance, conjointly forming the basis for what this study defines as a highly optimized species. Overall, it was determined that angiosperms exhibiting compound leaves were 195% better optimized for their environment, whereas simple leaved angiosperms required a more rigid and structured ecosystem to thrive. While this study is by no means all-inclusive, it does shed light on many intriguing characteristics of compound leaf-bearing angiosperms, including a strong correlation between compound leaf structures and hardiness, at least in the eastern United States. Further research is required to draw universal conclusions, however.

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