

A hierarchical consideration of causes and mechanisms of succession

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Questions of successional pattern and causality have been central concerns in vegetation ecology. In this paper we address the limits of the overextended models of Connell and Slatyer by discussing problems encountered in field tests. To help prevent such problems, we define the essential concepts needed to understand succession: pathway, cause, mechanism, and model. We then suggest a more complete enumeration of successional causes, and place them in a three-level hierarchy. The highest level in the hierarchy defines the general and universal conditions under which succession occurs: (1) availability of open sites, (2) differential availability of species, and (3) differential performance of species at the site. To provide a more detailed understanding of succession, each of these causes is decomposed into ecological processes. A further decomposition results in the third level of the hierarchy, which is required to elucidate the mechanisms of succession at particular sites and to ma