



Shade Tolerance, a Key Plant Feature of Complex Nature and Consequences

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Abstract

Light gradients are ubiquitous in nature, so all plants are exposed to some degree of shade during their lifetime. The minimum light required for survival, shade tolerance, is a crucial life-history trait that plays a major role in plant community dynamics. There is consensus on the suites of traits that influence shade tolerance, but debate over the relative importance of traits maximizing photosynthetic carbon gain in low light versus those minimizing losses. Shade tolerance is influenced by plant ontogeny and by numerous biotic and abiotic factors. Although phenotypic plasticity tends to be low in shade-tolerant species (e.g., scant elongation in low light), plasticity for certain traits, particularly for morphological features optimizing light capture, can be high. Understanding differential competitive potentials among co-occurring species mediated by shade tolerance is critical to predict ecosystem responses to global change drivers such as elevated CO₂, climate change and the spread of invasive species.