

P-11. Conspecific Distance-dependent Seedling Performance and Replacement of Conspecific- by Heterospecific Seedlings in Five Hardwood Species in a Temperate Forest

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The mechanisms creating species diversity in the context of Janzen-Connell model would be well understood by evaluating not only the conspecific distance dependent (CDD) seedling performance but also replacement effects (RE: extent of the replacement of conspecific- by heterospecific seedlings beneath adults). We evaluated CDD and RE as a log response ratio of seedling performance (height, age) between beneath and far from conspecific adults and a log response ratio of that between conspecifics and heterospecifics beneath adults, respectively, for five hardwood species with different ecological traits (i.e., seed size, mycorrhizal type, relative abundance) in a temperate forest. CDD was greater in three small-seeded species associated with arbuscular mycorrhizae (AM) than two large-seeded species associated with ectomycorrhizae (EM), probably due to that higher local conspecific densities of small-seeded species would amplify the pathogens beneath adults and AM fungi would have lower defensive ability against pathogens. As a result, small-seeded AM species showed smaller relative abundance compared to large-seeded EM species. RE was also greater for small-seeded and AM species compared to large-seeded and EM species, resulting in close positive relationship between CDD and RE. The traits indicate that replacement of conspecific by heterospecific seedlings was easily occurred in the small-seeded AM species with stronger CDD, suggesting that the small-seeded species would be attacked by strong virulence of specialized pathogens (e.g., soil pathogens, leaf diseases). The study demonstrates that the process and mechanisms creating species diversity is well understood by analysing RE effects in addition to CDD.