

Ecological strategy of woody plants in a seasonally dry tropical forest on infertile sandy soil

YUTARO FUJIMOTO

Woody plants are the main components of forests. Although they compete for limited resources, niche differentiation and resource partitioning seem to help species coexistence. In this study, I explored interspecific variations in ecological strategies of a woody plant community in a seasonally dry tropical forest on white sand, where the availability of water and nutrients is limited particularly during the dry season. In Chapter 2, I described the characteristics of a woody plant community ≥ 5 cm in diameter at breast height within a 15-ha plot in a dry forest in northwestern Madagascar, where 79% of the recorded species were endemic to this country. In Chapter 3, I compared leaf and stem functional traits of dominant tree species between leaf-phenology types. I found that a major functional trait, leaf mass per area, was different not only between evergreen and deciduous types but also between early deciduous and late deciduous types. In Chapter 4, I compared the functional traits between trees and lianas and demonstrated that trees exhibited more conservative traits than lianas when leaf phenology was considered. In Chapter 5, I explored spatial variations in forest structure, species diversity, and community-weighted mean functional traits within the 15-ha plot, which exhibited clear trends along an elevational gradient on a homogeneously gentle slope. Overall, woody plants had interspecific variations in functional traits related to ecological strategies, and those variations were continuous but distinct both between leaf-phenology types and between life forms. Identifying non-random variations in local sub-community characteristics on the homogeneous topography, this study suggests that significant variations in ecological strategies among woody species underpin the high biodiversity in this unique tropical forest with prolonged dry seasons and infertile sandy soil.