

Effects of Rainfall on Plant Survival in Restored and Unrestored Pine Stands in Lower Hanthana, Sri Lanka

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Restoration is crucial to assist the recovery of degraded, damaged or destroyed ecosystems to promote biodiversity and ecosystem services. This study was conducted to identify the relationship between rainfall and plant establishment in an unrestored (UP) and a restored (RP) *Pinus caribaea* Morelet plantation, in lower Hantana, Sri Lanka. In RP, partial thinning of pines followed by enrichment planting of four broad-leaved tree species and total thinning of pines have been initiated. In both sites fifteen plots (5 m x 5 m) and within each of them three subplots (1 m x 1 m) were demarcated randomly. The number of leaves in plants, height, and diameter at breast height (DBH) in two sites were obtained (seedlings in sub plots and saplings and trees in plots). Effects of rainfall on the species density and survival of plant species in the two sites were investigated. Data were categorized as seedling (< 50 cm), saplings group I (50 - 129 cm in height), saplings group II (129 - 300 in height) and trees (> 300 cm in height). The rainfall data for the study period was obtained from the Meteorology Department, Sri Lanka. Data were analyzed using non-parametric statistical techniques using the SPSS statistical software. When comparing the establishment of woody plant species in the two sites, more species were recorded in the restored site for all categories except for saplings group II. However many plants died within the 6 months of the study period, due to various factors including herbivory damage and over dominance of *Alstonia macrophylla*. The mortality decreased with the increased rainfall in restored site than the unrestored site. According to Spearman's correlations coefficient of seedlings, the restored site has more powerful negative relationship between rainfall and mortality while mortality comparison with rainfall data shows that when rainfall is high, mortality of trees is tending to be low.

Keywords: Mortality, Rainfall, Restored, Unrestored, Woody Plant Species