

58. Structural and ecological characteristics of successional vegetation stages: silvicultural systems for forest rehabilitation and sustainable management in Lama Forest Reserve (Benin, West Africa)

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The study was carried out in the Lama Forest Reserve located 100 km North of Cotonou, Benin (6°55' - 7°00' N, 2°04' - 2°12' E). Its main objective was to study the structural and ecological characteristics of the forest so as to design adequate silvicultural systems for the forests' rehabilitation and sustainable management. The species diversity of the forest was appreciated by computing Shannon index, Evenness coefficient of Pielou, alpha, beta and gamma diversity of the plant-communities. To assess dendrometric parameters, eight 0.25 ha (50 m * 50 m) permanent sampling plots were set up at representative points of each plant-community. In the sampling plots, diameter at breast height (dbh) (1.30 m above ground) and height of valuable species were measured on individuals with dbh ≥ 10 cm. In each permanent plot, 02 square subplots of 100 m² each were set up to assess regeneration (individuals with dbh < 10 cm). The diameter structures of the plant-communities and valuable species were adjusted to the theoretical distribution of Weibull, and served as a reliable indicator to choose adequate silvicultural systems. From the main results, four stages are observed in the successional vegetation of Lama Forest. They are composed of pioneer herbaceous, annual and perennial plant-communities, young and old secondary forest-communities. The secondary forests are in general the most diversified plant communities in terms of α and γ diversity. The tree-density of the forests ranged from 228 to 326 stems/ha with no significant difference at 5% of probability level. However, the basal area, the mean quadratic diameter, and the Lorey's mean height respectively varied from 9.27 to 21.20 m²/ha; 21.57 to 32.41 cm and, 15.21 to 22.28 m with significant difference at 5% of probability level. The highest values of these parameters are obtained in old secondary forests. On the basis of ecological traits, ability of regeneration, and diameter structure of the valuable / dominant forest species, silvicultural systems are proposed to enhance the forests' rehabilitation and sustainable management. They comprised valuable forest species planting in pioneer herbaceous plant-communities; enrichment planting, single-tree selection system, group-felling system, and follow up through tending operations (liana cutting, understory clearing, and canopy opening...) in secondary forests

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