

SUMMARY

Factors of ecological, status, physical - chemical soil properties in dipterocarp forest vary considerably, forming a variety of site types - forest status, so to consider the suitability of the teak we have implemented the thesis of "Determination of suitable sites, status and techniques for enrichment planting of teak (*Tectona grandis* L.f.) in dipterocarp forest in Dak Lak province" to serve the enrichment planting of dipterocarp forest degraded to meet all three socio-economic and environmental objectives in the management of dipterocarp forest. The time for monitoring experiments were from July 2010 to December 2015, data processing and thesis writing were from January 2016 to July 2017. The overall objective is to show the suitability and determination of combinations of the appropriate forest conditional factors for enrichment planting of teak in degraded dipterocarp forest ecosystem.

The study data consisted of 42 experimental plots (70×70 m, 4.900 m² for each plot) under real factor combinations on the dipterocarp forests of Buon Don, Ea Sup and Ea H'Leo districts, Dak Lak Province; formed 64 ecological plots (at least 370 m², the largest is 4.900 m²; the average is 3.215 m²). The teak tree was intercropped into the empty canopy, broken canopy to enrich dipterocarp forest, with the distance between teak trees together and between teak trees with dipterocarp trees (with DBH ≥ 10 cm) was 3 m. Experimental plots were planted in 2010, 2011 and 2012, and the collected teak data was repeated in 2013, 2014 and 2015, so that the age range of the experimental plots was A = 1.4; 2.3; 2.4; 2.7; 3.2; 3.3; 3.5; 3.9; 4.3; 4.4; 4.5; 5.4 years.

Weighted nonlinear and multivariate regression applied to develop and validate the models that figured out the combined effects and interactions of ecological factors, forest status and soil physical and chemical properties to growth, suitability level of teak; from that, identified the sites - the forest status for each level of suitability of the teak in dipterocarp forest. On that basis, combined with remote sensing and GIS technology to build maps to predict the suitability area of the teak in dipterocarp forest. Predictions for yield, productivity and economic efficiency of enrichment planting of teak in dipterocarp forest in Dak Lak province were also conducted.

Research results showed that teak enriched dipterocarp forest was classified into four levels of suitability: very good, good, average and poor suitability levels. At the predicted age of 6, the height growth of dominant teak tree had from 5,6 to 14,3 m, that of teak average height was ranged

from 3,8 to 11,2 m; Root collar diameter growth of teak reached 5,8 to 12,0 cm; Teak increment during the first five years of the dominant tree height (H troi) was from 0,9 to 2,3 m.year⁻¹; Average tree height (Htb) was from 0,6 to 1,8 m.year⁻¹ and root collar diameter (D goc) was from 1,0 to 2,1 cm.year⁻¹; This result shows that at suitability and very suitability, enrichment planting of teak in dipterocarp forest had growth rate of approximately teak monoculture while at a poor suitability, the growth rate was significantly lower than that of teak plantation. The teak density enriched in dipterocarp forest depends on three factors: the percentage of rocky rock, the density of dipterocarp trees and the level of suitability; we can enrich dipterocarp forest with a density of 166-1097 trees.ha⁻¹, an average of 500 trees.ha⁻¹. It has been determined the factors influenced the suitability level of enrichment planting of teak in degraded dipterocarp forest as a basis for the identification of site types - the appropriate status: ecology group of dipterocarp forest had three factors: soil units, waterlogged, and small stone rates; Forest status group of dipterocarp forest - the indicator vegetation had three factors: the presence of *Eupatorium odoratum* Linn, dominant tree species and density of dipterocarp forest; Soil physical and chemical properties group of dipterocarp forest had five factors: % sand, N, P₂O₅, K₂O and Ca²⁺; combination of three groups of ecological, soil physical and chemical properties, forest status - indicator vegetation figured out seven factors affected significantly as follows: soil units, waterlogged, presence of *Eupatorium odoratum* Linn, dominant tree species in dipterocarp forest, % sand, N, P₂O₅; The four factors used to determine quickly the suitability of teak in the field were: percentage of small stone coverage, whether presence of *Eupatorium odoratum* or not, whether waterlogged or not and the dominant forest species in dipterocarp forest. The three main influencing factors used to overlay maps in GIS and mapping suitability of teak in dipterocarp forest were: soil unit, slope and canopy area of dipterocarp forest. Dipterocarp forests can be enriched with teak trees at three levels of suitability (very good, good and average) of 41,095 ha, accounting for 43.3% of Dak Lak's production dipterocarp forests; in which, the area in two levels of promising suitability (very good and good) was 25,996 hectares, accounting for 27.4% of the degraded production dipterocarp forest. At a very good suitability level: with an 11 year cycle, the yield of teak was 8.6 m³.ha⁻¹.year⁻¹, production 94 m³.ha⁻¹ with 25 cm diameter product, NPV = 49 million VND.ha⁻¹.year⁻¹; At a good suitability level: with a 16 year cycle, the yield of teak was 5.9 m³.ha⁻¹.year⁻¹, the yield was 94 m³.ha⁻¹ with 25 cm diameter and NPV = 20 million VND.ha⁻¹.year⁻¹.