

Tanawich Suwanruengchai 2014: Effects of Soil Improvement and Fertilization on Soil Properties and Growth of Various Eucalypt Clones in Sandy Soil at Rayong Province. Master of Science (Silviculture Technology), Major Field: Silviculture Technology, Department of Silviculture. Thesis Advisor: Assistant Professor Roongreang Poolsiri, Dr.nat.techn. 140 pages.

The effects of soil improvement and fertilization on soil properties and growth of various eucalypt clones in sandy soil were investigated at Ban Chang, Rayong province using a split plot completely randomized design with 2 replications consisting the main unit (3x3 factorial) was Eucalypt clone and soil improvement method and the sub unit (3x3 factorial) was the fertilizer formula and level of fertilizing. The spacing was 1.5x3 m. Soil samples were collected before planting and after 1 and 2 year plantings. Diameter at ground level ( $D_0$ ), diameter at breast height (DBH) and total height (Ht) were measured at planting and after 3, 6, 9, 12, 18 and 24 month plantings.

The results showed that Eucalypt clone D1 had the highest mean values of  $D_0$ , DBH and their growth rate (GR). Eucalypt clone D11 had the highest mean values of Ht, GR Ht, relative growth rate (RGR) of Ht. The RGR Ht was significantly different ( $p < 0.05$ ) among Eucalypt clones. In addition, soil improvement by using organic fertilizer showed the highest mean values of  $D_0$ , DBH, GR  $D_0$ , GR DBH and RGR  $D_0$  all of which were significant differences ( $p < 0.05$ ) from other soil improvement methods. Organic fertilizer affected the increasing of the small particle size ratio in the soil. The main component of the soil was sand derived from the soil parent material. Soil textures were sandy loam, loamy sand and sandy clay loam. Organic fertilizer produced the highest mean values of soil pH, organic matter, total nitrogen, available phosphorus, exchangeable potassium, exchangeable calcium and exchangeable magnesium. Soil improvement by planting thornless mimosa (*Mimosa invisa* Mart.) produced the lowest mean value of soil bulk density and the highest mean value of soil porosity. In addition, the application of 27-6-6 formula fertilizer produced the highest soil pH, total nitrogen, exchangeable potassium, exchangeable calcium and exchangeable magnesium and there were no significant differences among the fertilizer formulae in soil properties except soil pH at 0-15 cm soil depth were significant differences ( $p < 0.05$ ) among fertilizer formulae. In addition, the application of the highest rate of fertilizer produced the highest mean values of  $D_0$ , DBH, Ht, GR  $D_0$ , GR DBH, GR Ht, RGR  $D_0$ , RGR DBH, RGR Ht, soil pH, total nitrogen, exchangeable potassium, exchangeable calcium and exchangeable magnesium but they were not significant differences with the application of the medium rate of fertilizer.

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Student's signature

Thesis Advisor's signature