Specifying Spatial Dependence for Teak Stands Specific to Solomon Island-Derived Clones in Tawau, Sabah, Malaysia: A Preliminary Study

ABSTRACT

The magnitude of spatial dependence on teak tree growth was examined based on a teak plantation managed by the research and development team at Sabah Softwood Berhad, Brumas camp, Tawau, Sabah, Malaysia. A sample of 432 and 445 georeferenced individual tree points specific to Solomon Island-derived clones that were 6 and 7 years old, respectively, were analyzed, as previous findings showed that this was the genotype that thrived the most. This study aims to show that spatial dependence exists in the 6-and 7-year-old teak tree blocks of the plantation and that there are changes in the magnitude of spatial dependence when it is analyzed as a continuous plot. Moran's I values and Moran scatterplots as well as semivariograms and thematic maps were used to satisfy the hypothesis regarding the relationship between spatial dependence and the growth of the physical parameters: the diameter at breast height (DBH), height, and the volume of the teak tree. The Moran's I values that were calculated rejected the null hypothesis, suggesting the existence of strong spatial dependence for all of the physical parameters and for both the 6-and 7-year-old samples. The semivariograms were plotted and showed an increasing trend as the lag distance between trees increased and showed changes as the trees aged. These findings prove significant spatial dependence in the growth of the physical parameters of teak trees. Hence, growth model methodologies based on spatial distribution must be developed to further understand the spatial distribution of teak tree plantations.