

Thippawan Sungtong 2012: Growth Performances and some Physiological Characteristics of *Eucalyptus camaldulensis* Dehnh. in the Second Generation Progeny Test at Wang Nam Khiao Forestry Student Training Station, Nakhon Ratchasima Province. Master of Science (Silviculture Technology), Major Field: Silviculture Technology, Department of Silviculture. Thesis Advisor: Assistant Professor Sapit Diloksumpun, Ph.D. 121 pages.

The objective of this study was to determine the genetic variation in growth and some physiological characteristics affecting the growth of *Eucalyptus camaldulensis* Dehnh. half-sib families in the second generation progeny test at Wang Nam Khiao Forestry Student Training Station, Nakhon Ratchasima province. The growth measurements were undertaken in all 120 families derived from 23 provenances, while seasonal variation in some physiological characteristics (light-saturated net photosynthesis, stomatal conductance, transpiration, intrinsic water-use efficiency, pre-dawn water potential and chlorophyll content) was determined in 10 selected families representing all regions in their natural distribution.

The results indicated that the differences in height, diameter at breast height (DBH), aboveground biomass and current annual increment (CAI) were highly significant among provenances and families ($p < 0.01$). Among 120 families studied, families number 219 and 227 showed the most promising growth performance in terms of CAI in height, DBH and aboveground biomass. The differences in all physiological characteristics were also highly significant among seasons ($p < 0.01$), but not among families ($p \geq 0.05$), except the difference in chlorophyll content was significant among both seasons and families ($p < 0.05$). Nevertheless, the results indicated three seasonal trends of physiological characteristics: high values with high seasonal variation; moderate to high values with low seasonal variation; and low values in all season. In addition, the correlation analysis showed positive correlation between growth and stomatal conductance and transpiration in the wet season. Therefore, a further study on the correlation between growth and other physiological parameters such as leaf area index is recommended for the selection of *E. camaldulensis* families that could grow and adapt well to the site.

Student's signature

Thesis Advisor's signature