

Genetic Improvement Potential for Wood Production in *Melaleuca cajuputi*

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Abstract : *Melaleuca cajuputi* is a moderately fast-growing species and considered as a multi-purpose tree as it provides fuelwood, piles and frame poles in construction, leaf essential oil and honey. It occurs in Australia, Papua New Guinea, and South-East Asia. *M. cajuputi* plantation can be harvested on 6-7 year rotations for wood products. Its timber can also be used for pulp and paper, fiber and particle board, producing quality charcoal and potentially sawn timber. However, most reported *M. cajuputi* breeding programs have been focused on oil production rather than wood production. In this study, breeding program of *M. cajuputi* aimed to improve wood production was examined by estimating genetic parameters for growth (tree height, diameter at breast height (DBH), and volume), stem form, stiffness (modulus of elasticity (MOE)), bark thickness and bark ratio in a half-sib family progeny trial including 80 families in the Mekong Delta of Vietnam. MOE is one of the key wood properties of interest to the wood industry. Non-destructive wood stiffness was measured indirectly by acoustic velocity using FAKOPP Microsecond Timer and especially unaffected by bark mass. Narrow-sense heritability for the seven traits ranged from 0.13 to 0.27 at age 7 years. MOE and stem form had positive genetic correlations with growth while the negative correlation between bark ratio and growth was also favorable. Breeding for simultaneous improvement of multiple traits, faster growth with higher MOE and reduction of bark ratio should be possible in *M. cajuputi*. Index selection based on volume and MOE showed genetic gains of 31 % in volume, 6 % in MOE and 13 % in stem form. In addition, heritability and age-age genetic correlations for growth traits increased with time and optimal early selection age for growth of *M. cajuputi* based on DBH alone was 4 years. Selected thinning resulted in an increase of heritability due to considerable reduction of phenotypic variation but little effect on genetic variation.

Keywords : acoustic velocity, age-age correlation, bark thickness, heritability, *Melaleuca cajuputi*, stiffness, thinning effect

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