ABSTRACT

Elevens years old Pinus merkusii trees from half-sib progeny test were sampled for study specific gravity, moisture content, shrinkage, bole straightness, branching type and circumference. Sample disks removed from 225 trees at 200 cm above ground during thinning.

Analysis of variance indicated significant differences among trees for specific gravity, air-dry moisture content and bole straightness. Variation of wood within trees from pith to bark also occurred. Significant differences within trees variation was detected for specific gravity, green moisture content and shrinkage. Average over all trees for its specific gravity , radial shrinkage and tangential shrinkage increased across disk from pith outwards, but the results shows an opposite tendency for green moisture content and longitudinal shrinkage.

Estimates of heritability were high for specific gravity (h^2_i = 0.571), air-dry moisture content (h^2_i = 0.634, bole straightness (h^2_i = 0.522), but moderate for green moisture content. Heritabilities for middle wood and outer wood were high. Therefore, there is an opportunity to improve the quality of wood by decreasing the proportion of juvenile wood through trees selection.

Genetic correlations among several traits indicate significant differences, except for both bole straightness and green moisture content. Phenotypic correlation indicate significant differences only between traits specific gravity and green moisture content because environment effect acting on these traits are negatively correlated. While increasing specific gravity, it is possible to decrease its green moisture content but it seems difficult to increase specific gravity and bole straightness simultaneously .

Furthermore, genetic gains using indirect selection for several traits were low, except for specific gravity and green moisture content with the relative selection efficiency -0.540 and -1.109, respectively. Selection index is the best way to achieve improvement if the two traits could not be improve simultaneously. Genetic gains using selection index were low with relative selection efficiency ranged from 0.01 to 0.27.

Keys word: P. merkusii, physical properties of wood, bole straightness, correlation, genetic gain, selection index