

GENETIC VARIATION IN WOOD ANATOMY OF *PINUS TAEADA*

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Keywords: Pinus taeda, genetics, wood anatomy, cell structure, tree-ring analysis.

Pinus taeda is the most frequently planted forest tree species in southern Brazil, where the species currently occupies more than 1.8 million ha with one of the highest productivity rates world-wide (more than 30 m³ of wood ha⁻¹ year⁻¹). Because of its economic importance, several breeding programs were established in the region. However, the low wood density, due to the large portion of early wood per tree-ring, is limiting the use of *P. taeda* as a high quality saw - and structural timber. Its genetic improvement for this trait is one of the alternatives to be considered. The exploration of the genetic variability depends on the knowledge of the genetic variation of growth patterns at cell level. This paper compares the wood anatomy of three families with different diameter growth (large, medium and small) at cell level, from a progeny test plot that was planted in 1997 at Campo do Tenente Municipality, at Paraná State, Brazil (26° 01' 59.1" South, 49° 36' 27.7" West, altitude approx. 800 m asl) by the Paraná Federal University and Placas do Paraná, a Brazilian private forest company. The three families (F22: large-; F58: medium-; F21: small-diameter at breast height, DBH) were selected from a population of 60 families at an age of eight years (half of the harvesting age). Three trees of each family were cut and stem discs were collected at breast height. The anatomic wood structure analysis was carried out at the Tree-Ring Laboratory of the Institute for Forest Growth, University Freiburg, Germany. The families were compared by the following cell-parameters: a) radial cell diameter; b) radial cell wall thickness and lumen width; c) number of cells and; d) ratio of early wood, middle wood and late wood. In contrast to the middle and late wood, the extension of early wood differed conspicuously between the families, in the tree rings grown during the growing seasons 2003, 2004 and 2005. The family with the largest DBH (F22) showed the largest cells with the largest lumen. Furthermore, this family also produced the largest number of cells and the highest early wood ratio. The family with medium DBH (F58) showed smaller cells than the family with the smallest DBH (F21), nevertheless its radial growth was higher because F58 produced more cells during the growing season than F21. F58 also presented the thickest cell walls and the highest percentage of late wood. Altogether F58 shows the most homogenous development in number of cells, tree-ring width, cell diameter, accumulated lumen and accumulated cell wall diameter.