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Estimation of Annual Increase of Oven-dried Weight of Sugi (*Cryptomeria japonica*) Trunks

Takeshi Fujiwara¹⁾

1) Forestry and Forest Products Research Institute

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Abstract: In order to estimate changes of carbon absorption by trees, a method for calculating annual increases of oven-dried weight of individual trunks from width and mean density of annual rings was established. Discs at 1 m intervals above 0.2 m high from 24 sugi (*Cryptomeria japonica* D. Don) trees were collected after measuring green weight of 1 m long logs. Radial strips including the pith were cut from the discs for soft x-ray densitometry and the other parts of the discs were used for measuring oven-dried weight of the discs. Cross-sections 2 mm thick processed from the strips were exposed to soft x-rays followed by densitometry for measuring width and mean density of each annual ring. The weights calculated from the area and mean density of each annual ring and log length were significantly correlated with the oven-dried weights of the logs. Therefore, the densitometry was applicable for calculating the oven-dried weight of trees. It is believed that ring width and mean density can be used to estimate the annual increase of oven-dried weight of the tree trunks. The annual increase of the oven-dried weight calculated as accumulation of weight of each annual ring was influenced by the ring width, because it changed with variation of area of annual rings. Density variation seemed to affect the fluctuation of weight gain and its effects was considered to be smaller than the ring width.

Keywords: Estimation of biomass, *Cryptomeria japonica*, densitometry, ring width, mean density

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