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RELATIONSHIP OF THE ANGLE OF LEAN OF TRUNK AND GROWTH ECCENTRICITY WITH TENSION WOOD FORMATION IN FOUR CLONES OF *HEVEA BRASILIENSIS*

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The relationship between tension wood formation and growth eccentricity of leaning trunks for four clones of *Hevea brasiliens* (Tjir 1, GT 1, RRIM 600 and RRII 105) were studied. The growth eccentricity did not show consistent variation with respect to tree height. The leaning angle and proportion of tension wood were correlated for the clone RRII 105. For all the four clones the correlation between tree height and angle of lean was highly significant. Tree height and proportion of tension wood showed highly significant correlation for RRIM 600. The relationship between angle of lean and growth eccentricity was significant for GT 1.

Keywords: Growth eccentricity, *Hevea brasiliensis*, Leaning angle, Pith eccentricity, Tension wood.

Trees are subjected to various environmental stresses like wind, phototrophic and geotropic movements, intrinsic growth stresses etc., which displace the vertical orientation of trunks and branches. Hence, they show a tendency to develop special mechanisms to restore the original position by producing specialized tissues in the wood. Reaction wood is an example of this type of tissue produced by the cambium in response to the gravitational stimulus induced by the displacement of the axis from vertical (Wardrop, 1964; Timell, 1969; Cote *et al.*, 1969; Fischer and Stevenson, 1981). Reaction wood in angiosperms called tension wood (TW), is usually formed in the upper side of leaning axes, where tensile stress is exerted (Wardrop and Dadswell, 1948; Scurfield and Wardrop, 1963; Wardrop and Davies, 1964; Wardrop, 1964; Westing, 1968; Philipson *et al.*, 1971). In fast growing hardwood species like rubber (*Hevea brasiliensis*) the incidence of TW is much more in comparison with slow growing tree species, even though the influence of environmental factors and angle of tilt may be identical. Formation of TW is usually, but not always associated with growth eccentricity or pith eccentricity (PE). Patel *et al.*, (1984) reported that the growth eccentricity decreased with increase in specimen angle in *Kigelia pinnata*. Fischer and Stevenson (1981) extensively studied the influence of TW formation on tree architecture in various hardwood species and classified *H. brasiliensis* under Raugh's model of tree architecture, where the angle of orientation of the tree axis increased with a corresponding increase in TW formation in both the upper and lower parts of the bent axis. They further proved

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