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Variation in Wood Anatomical Properties of Acacia seyal var. seyal Tree Species Growing in Different Zones in Sudan

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Abstract : Sudan is endowed by a great diversity of tree species; nevertheless, the utilization of wood resources has traditionally concentrated on a few number of species. With the great variation in the climatic zones of Sudan, great variations are expected in the anatomical properties between and within species. This variation needs to be fully explored in order to suggest the best uses for the species. Modern research on wood has substantiated that the climatic condition where the species grow has significant effect on wood properties. Understanding the extent of variability of wood is important because the uses for each kind of wood are related to its characteristics; furthermore, the suitability or quality of wood for a particular purpose is determined by the variability of one or more of these characteristics. The present study demonstrates the effect of rainfall zones in some anatomical properties of Acacia seyal var. seyal growing in Sudan. For this purpose, twenty healthy trees were collected randomly from two zones (ten trees per zone). One zone with relatively low rainfall (273mm annually) which represented by North Kordofan state and White Nile state and the second with relatively high rainfall (701 mm annually) represented by Blue Nile state and South Kordofan state. From each sampled tree, a stem disc (3 cm thick) was cut at 10% from stem height. One radius was obtained in central stem dices. Two representative samples were taken from each disc, one at 10% distance from pith to bark, the second at 90% in order to represent the juvenile and mature wood. The investigated anatomical properties were fibers length, fibers and vessels diameter, lumen diameter, and wall thickness as well as cell proportions. The result of the current study reveals significant differences between zones in mature wood vessels diameter and wall thickness, as well as juvenile wood vessels, wall thickness. The higher values were detected in the drier zone. Significant differences were also observed in juvenile wood fiber length, diameter as well as wall thickness. Contrary to vessels diameter and wall thickness, the fiber length, diameter as well as wall thickness were decreased in the drier zone. No significant differences have been detected in cell proportions of juvenile and mature wood. The significant differences in some fiber and vessels dimension lead to expect significant differences in wood density. From these results, Acacia seyal var. seyal seems to be well adapted with the change in rainfall and may survive in any rainfall zone.

Keywords : Acacia seyal var. seyal, anatomical properties, rainfall zones, variation
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