Study on Vessel Characteristics and their Relationships with Wood Density and Texture of Selected Uncommon Timber Species in Sri Lanka

W.J. Madurangi[1*], D.A.B.N. Amarasekara[1] and N. Ruwanpathirana[2]

[1] Department of Crop Science, Faculty of Agriculture, University of Ruhuna, Mapalana, Kamburupitiya, Sri Lanka

[2] Research Development and Training Division, State Timber Cooperation, Sri Lanka

Abstract

There are many uncommon local timber species available in Sri Lanka with potential to use as high quality timber which has high density (>500 kgm^{-3}) with fine or moderate texture. Therefore, it is important to identify these species and classify according to their timber properties to popularize among consumers and people engaged in timber industry and forest management. Determination of the relation between wood anatomical structures specially vessel properties with related to wood physical properties such as texture and density are important for the wood identification process. In this investigation, approximately same age 86 uncommon timber species were selected. (Eg: Masmoru, Walipanna, Gonna, Aridda, Dickwenna, etc.) The samples were selected from the center part of the heartwood as 5 samples from each plant in each species. Timber density was calculated by Archimedes method. To study the anatomical features, slides were prepared with small wood sections and observed through the microscope using anatomical photos and Micrometrics SE Premium 4 software. Texture was determined using vessel diameter (vessel diameter (μm) 0 -100: fine texture, 100 – 200: moderate texture, > 200 μm: coarse texture). There is a significant association between wood texture and density. Further, a significant negative relationship was observed between wood density and vessel diameter (r = -0.866, p<0.05), wood density and vessel perimeter (r = -0.610, p<0.05) as well as wood density and vessel area (r = -0.546, p<0.05). The wood density and vessel number had a very poor positive relationship (r = 0.458, p<0.05). There is no significant relationship between wood density with vessel arrangement and shape. Vessel number showed significant negative relationship with vessel diameter (r = -0.582, p<0.05). Wood texture can be mainly categorized into coarse texture with rough surface and fine to moderate texture with smooth surface of wood. The classification according to texture explains that most selected uncommon species has fine to moderate texture when compare to coarse texture. Finally, these fine & moderate texture species with high density can be suggested to popularize within the fields of lumber industry, silviculture, forestry and also among consumers because those spp. have high timber quality and thereby high economic value.

Keywords: Wood density, Wood texture, Wood vessel properties

Corresponding Author: janeeshamadurangi3@gmail.com