

“Multi-Sonic Timbre” of the Biula: The Integral Role of of Tropical Tonewood in Bajau Sama Dilaut Bowed Lute Acoustics

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Abstract : The selection of Tonewood is critical in defining tonal and acoustic qualities of string instruments, yet limited research exists on indigenous instruments utilizing tropical woods. This gap is addressed by analyzing the "multi-sonic timbre" of the Biula (Bajau Sama Dilaut), crafted by rainforest indigenous communities using locally accessible tropical species such as jackfruit and coconut, whose distinctive grain patterns, density, and moisture content, significantly contribute to the instrument's rich harmonic spectrum and dynamic range. Unlike Western violins that utilize temperate woods like Maple and Spruce, the Biula's sound is shaped by the unique acoustic properties of these tropical tonewoods. To further investigate the impact of tropical tonewoods on the biula's acoustics, frequency response tests were conducted on instruments constructed from various local species using SPEAR (Sinusoidal Partial Editing Analysis and Resynthesis) software for spectral analysis, measurements were taken of resonance frequencies, harmonic content, and sound decay rates. These analyses reveal that jackfruit wood produces warmer tones with enhanced lower frequencies, while coconut wood contributes to brighter timbres with pronounced higher harmonics. Building upon these findings, the materials and construction methods of biula bows were also examined. The study found that the variations in tropical hardwoods and locally sourced bow hair significantly influence the instrument's responsiveness and articulation, shaping its distinctive 'multi-sonic timbre.' These findings deepen the understanding of indigenous instrument acoustics, offering valuable insights for modern luthiers interested in tropical tonewoods. By documenting traditional crafting techniques, this research supports the preservation of cultural heritage and promotes appreciation of indigenous craftsmanship.

Keywords : multi-sonic timbre, biula (bajau sama dilaut bowed lute), tropical tonewoods, spectral analysis, indigenous instrument acoustics

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